THE OIL WEEKLY

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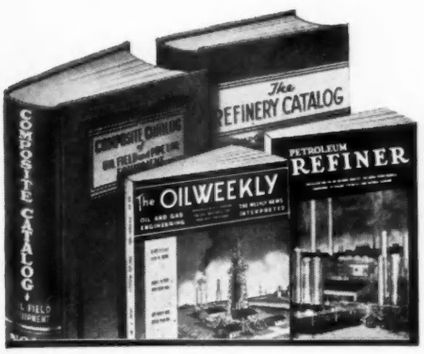

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The Oil Man's Calendar

NOV. 16–18	American Institute of Chemical Engineers, Netherlands Plaza Hotel, Cincinnati.
17–21	National Chemical Exposition, and Industrial Conference, American Chemical Society, Chicago.
19–20	American Association of Oilwell Drilling Contractors, Tulsa.
DEC. 2	New Mexico Oil and Gas Association, Artesia Hotel, Artesia.

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The Changing Panorama

More Steel for Oil Usage Seen

HEAVY cancellations of war orders by the government during the past three weeks have materially eased the steel situation at the mills and ultimately may have considerable effect on steel available to the oil industry, inquiry among manufacturers and others attending the A.P.I. meeting has revealed.

Of course it is not possible for other than the proper government agency to estimate accurately the gross amount of the cancellations received to date, but figures as high as four to five billion dollars have been mentioned. These figures, however, represent merely guess work and are based only in part on information regarding some particularly heavy cancellations.

Talk among oil men and equipment men at the A.P.I. meeting had it that one domestic manufacturing plant, recently built at a cost of approximately two hundred million dollars had been shut down recently, shortly after getting into production with a plant force of several thousand men.

Practically every manufacturer who was contacted indicated that he had had either some cancellations or reductions in orders. None, however, had received cancellation on all of his war work.

Necessity of rebalancing the war production program on equipment and material was the reason given for the cancellations, by a representative of the War Production Board. He said that when the original orders were placed the Army and Navy had no way of knowing exactly what was needed and it was felt that it would be better to buy too much rather than too little. Now, he asserted, the actual production program is under way and production of some materials, it is found, is in excess of present needs and out of balance with other needs. Steel, therefore, which has been going into some products, will be transferred to others. Bombs, shells and small arms ammunition have been coming off the production line in such quantities as to make it advisable to slow down on them. According to this representative of W.P.B. even had the U. S. aircraft program run ten percent ahead of schedule the planes built could not possibly have dropped, within a reasonable time limit, the bombs already made. Other sources said that bombs already have been made in sufficient quantities to provide two bombs for every person in Germany and the shell manufacturing production has reached the point where it would take four years to load the shells already made!

Apparently a shift to heavier aircraft production is in the offing, the alloy steel previously allocated to shells and bombs and some other products being now destined for planes.

As a result of these cancellations the steel situation at the mills is considerably easier than it was a few weeks ago. Of this there is no doubt.

What the effect will be on availability of steel for oil industry usage is not certain. Some with whom THE OIL WEEKLY representatives talked, seemed to think that it might possibly mean more steel for oil. On the other hand, a supply company executive said that it was his opinion that no additional steel would be allocated to oil until the governmental agencies were satisfied that the oil industry could not "live off its own fat." This executive was of the opinion that materially increased allocations of steel to drilling and production usage would not be forthcoming until a better picture of oil industry equipment and tubular reserves is in the hand of the government—in other words until the government is satisfied that many companies do not have a surplus of supplies stored away.

In the meantime, in an action which would appear to be entirely contrary to the picture presented in the first several paragraphs foregoing, W.P.B. has sent out a directive which in effect prohibits the manufacture of pumping units after January 5. Manufacturing companies are allowed from now to that date to complete any units in process of manufacture.

Something which makes this directive difficult to understand is the report that structural steel, largely used in the manufacture of pumping units, is one of the items which appears most available from the steel mills.

In pursuance of the United States program of economic assistance to Bolivia, the Export-Import Bank of Washington has loaned $300,000 to the Banco Central of Bolivia for use of the Bolivian petroleum monopoly.

That sum was the first loan from a fund of $5,500,000 earmarked for the development of the Bolivian petroleum industry. The loan will be used by the petroleum monopoly to buy equipment from the United States.

Oil Supply Critical In Many Countries

SHORTAGES of oil have become increasingly severe in many countries. Seeking to conserve Germany's critically limited oil reserves for military use, Nazi authorities in Holland have ordered conversion of the Dutch fishing fleet to use of gasogene equipment, which will generate producer gas from wood. Whole fleets of some fishing towns already have been converted. Germany pays one third the cost, boat owners pay 15 percent of the balance on installation, and the rest is payable in installments through deductions from receipts of each catch. Throughout Europe, producer gas and other substitutes for gasoline are being used substantially for propelling automobiles, trucks, and buses; but it is becoming increasingly difficult to install and operate even the substitute-using equipment.

To conserve gasoline and rubber, additional reductions in public transport services are scheduled. New restrictions on private motoring have limited even the use of gasoline substitutes. No vehicle can be operated on fuels other than gasoline or diesel oil without license, and the license is issued only for essential use and if the fuel involved is available for such use. More trains are needed for essential purposes, and unnecessary travel is effectively discouraged.

Serious fuel shortage is expected to force into idleness many tractors in French Morocco. Oils in storage are practically exhausted, and crude oil from the small field at Petitjean yields only an insignificant quantity of lubricants, although it provides gasoline that serves to supply the government and to start motors when gasogene equipment using charcoal gas is employed, while fuel oil made along with the gasoline helps to run electric plants.

Scarcity of petroleum is seriously curtailing industry and all forms of transportation in Brazil, including highway, water, and rail. Production of gasogene equipment is increasing, and the units, made to generate producer gas from charcoal are being installed not only on motor vehicles but also on railway cars and on boats. Coal is being conserved, meanwhile, by rationing of illuminating gas, manufactured from the coal.

Uruguay's petroleum shortage has

grown more acute and forced tightening of gasoline rationing. In Montevideo, private cars of over 24 horsepower have been limited since September 1 to 80 liters per 2 months, and outside the capital the allowance is 50 liters, while other cars and trucks are rationed proportionately. Allotments of petroleum to railways have been reduced, and curtailment of their services is expected. In order to reduce fuel consumption by buses and trolley cars, workers in offices and stores, under government decree, will work 6¾ hours continuously instead of taking out 2 hours at mid-day to go home for lunch.

Venezuela in Fourth Phase of Oil War

THE widely changing fortunes of the petroleum industry of Venezuela have turned again for the better. Following the drastic curtailment of markets and production in the early spring of this year, when the submarine campaign of the Axis in the Caribbean was at its height, there has been more recently a substantial recovery in demand and production, in line with growing activity and power of the war machine of the United Nations.

The Venezuelan oil industry therefore appears to have entered upon a fourth distinct phase of war experience. Through 1940 the industry suffered curtailment of outlet in losing European markets, but in 1941 it set a new all-time record in production in supplying war needs of Britain and national defense requirements of the United States, after which came the sharp curtailment of markets through Axis attacks on shipping, followed now by some recovery of markets.

Petroleum is a principal industry of Venezuela, and curtailment of production has caused serious unemployment and loss of revenue for the government, while protracted shutdown of wells, in absence of adequate storage, has caused damage to them, which constitutes economic loss. Numerous oil-industry workers, particularly those unskilled, have been thrown out of employment.

The petroleum industry normally provides over a third of all revenue received by the government and over three fourths of the Venezuelan foreign exchange, and protracted loss of petroleum revenues would force serious curtailment of various government programs, such as agricultural development and public works, which are financed in large measure with revenues derived from the petroleum industry.

Refiners Favor Wage-Hour Change

IN reflection of the increasing difficulties imposed on the oil industry by the manpower shortage, the Gulf Coast Refiners Association has approved a resolution favoring the modification of such wage-hour laws now being in force, which limit the work week to 40 hours with overtime payments for additional hours.

The association feels, according to the resolution, that such wage hours legislation should be changed, modified or amended to extend, without extra pay, the work week to such hours as will not prove injurious to health and welfare, or at least to permit labor to do so by agreement.

"The existing manpower shortage can be reduced and efficiency and production improved by permitting a work week of at least 48 hours, or possibly 56 hours," declared the resolution, "and it is recommended that legislation be immediately passed by the national Congress authorizing labor and industry to adopt a work-week of such larger number of hours. The association favors, therefore, a work week of at least 8 hours per day for at least 6 days per week in order to more fully take advantage of all available manpower.

"The association further believes that as long as price ceilings are imposed on the oil industry, the penalty of extra pay should not be imposed for a work week of no more than 48 to 56 hours. The growing shortage of manpower and the necessity for curbing inflationary trends both point to the necessity for immediate modification of existing wage-hour legislation. Refining operations under existing price ceilings and under current governmental directives render it impossible for the refiner to absorb increases in costs of operations"

Must Provide Supply For Big Inch Line

WITH the 24-inch pipe line due to be finished and placed in operation as far as Illinois by the end of the year, plans for providing a supply source for the system must be completed promptly so all mechanical work can be finished in time to prevent any delay in starting the flow of oil and products eastward.

Several plans to accomplish this are being worked out. They must be finished and in operation when the line is ready to pump its first barrel. It is understood that steady progress is being made in working out the numerous details, and that the necessary supply should be available when the line is ready.

Revised plans now call for an average schedule of only 150,000 barrels of oil and products daily during the first quarter of 1943, as only a few of the pump stations will be in service by that time. The throughput of the system is not expected to reach its capacity of 300,000 barrels per day until April. However, even the smaller volume now contemplated when the line starts pumping represents a sufficient shift in oil movement to constitute a major readjustment. Thus, besides nationwide gasoline rationing, another far-reaching impact that requires prompt action is due to strike the industry by the end of the year.

So vast is the shift in direction of petroleum movement that it will reach as far as Southwest Texas, which is expected to be called upon to furnish at least an additional 90,000 barrels of oil per day. Several lines that have been carrying oil from East Texas to refineries on the Gulf Coast will be reversed, to move oil and products north instead of south. Refineries at Houston-Beaumont-Port Arthur, which have depended to a considerable extent upon East Texas crude, must make up their loss from Gulf Coast and Southwest Texas producing areas.

Oil Concerned Over Junking of Tools

THE oil industry has an important stake in the question of whether the government will order the junking of presently idle automobile manufacturing machines, tools, and dies, to satisfy needs of scrap steel.

Most of the leaders of the automotive industry as well as many other people feel that scrapping of the automotive equipment should be carried out only as a last resort; that non-productive metal of every kind should be junked before sacrificing machines and tools that can provide production and employment immediately after the war.

Without the automobile manufacturing machines and tools on hand at the end of the war, they would have to be made, and the resumption of production would be greatly retarded, while there would be unemployment of mass production workers for a year or longer.

Resumption of normal consumption of gasoline and automotive lubricants and greases similarly would be long delayed.

WASHINGTON ROUNDUP

By B. F. LINZ
Washington Correspondent

»

"Little Second Front" Throws Gasoline Out of Balance

»

OPC Adopts Plan to Meet Oil Requirements in Canada

»

Pipe for Second Big-Inch Line Moving to Right-of-Way

WITH the East Coast supply situation thrown out of balance by the opening of the North African "little second front," oil officials in Washington this week worked desperately to keep homes warm and insure maintenance of essential motor operations.

The situation was said to be the most critical the East has yet experienced.

An immediate reduction of consumption by 139,000 barrels per day, 80,000 barrels of it to be gasoline, was recommended by Coordinator Ickes to a highly disturbed War Production Board whose officials foresaw Congressional public criticism of their obstinate refusal in the past to take steps to safeguard against such a situation as now exists.

With the American forces in the Atlantic and Mediterranean requiring enormous quantities of oil products, most of which moves to them from the East, civilian supply is running close to 180,000 barrels a day under minimum rationed demand, with little prospect of any decided improvement until the first leg of the "big inch" pipe line comes into operation in January.

As a result of the situation, the WPB was said to be moving quickly to provide the priorities necessary for completion of the pipe line to the coast, and Ickes is expected shortly to ask the board to approve a parallel line for products.

Other developments of the week included a Supreme Court decision that employes of drilling contractors are covered by the Fair Labor Standards Act because oil from a well drilled under contract may find its way into interstate commerce, and initiation by the OPC of an inventory of idle or surplus oilfield tubular goods available for redistribution.

Cut in Consumption Necessary as East Coast Stocks Dwindle

A cut of 139,000 barrels per day in East Coast consumption of gasoline and fuel oils was urged upon the War Production Board during the week by Coordinator Ickes, with emphasis upon immediate adoption of what appears to be the only alternative to cold homes or a shortage of vital petroleum products for the American forces of occupation in North Africa.

Admitting that he has lost the battle of supply, Ickes on November 10 announced that it will not be possible to continue to ship gasoline into the East in the quantities of the immediate past and still have the transportation needed for military demand. Two days later he revealed that a cut of approximately 12 percent in overall consumption would be necessary.

Of the 139,000 barrels a day to be saved, 80,000 barrels will be in gasoline, a cut of 20 to 25 percent. Whether the cut would be spread among all classes of rationed motor vehicles, or placed largely upon the holders of "A" books to reduce non-essential driving was not disclosed by the coordinator.

Announcing his recommendation to the WPB, Ickes said the situation "has changed drastically and for the worse" as a result of the North African occupation, which has drawn heavily on East Coast supplies.

Rail deliveries during the week ended November 7 totaled 768,145 barrels per day, an increase of two percent over the 753,594 barrels daily of the preceding week, but the coordinator said there is little hope of getting the average above 800,000 barrels.

The rail situation has been affected by the rapid deterioration of rolling stock, reports to the OPC showing that about 14 percent of the tank cars constantly are in the repair shops, as compared with three percent for other types of freight carriers. This situation is expected to become more serious as time goes on, the average age of the tank cars in service being 18 years.

At the present time, it was learned, the East Coast supply is running about 1,219,000 barrels daily against an estimated minimum rationed demand of 1,400,000 barrels, both exclusive of military requirements.

While Ickes attributed the shortage in supply to expansion of military operations, it is known that gasoline consumption has failed to get down to the figure aimed at when rationing was adopted. While consumption during the early days of rationing was satisfactorily close to the set figure, it has since been rising steadily, largely as a result of "black market" operations, with no apparent success for the OPA's efforts to check it.

Openly disturbed over the situation, first revealed in a report of the committee on Petroleum Economics to the PIWC meeting in Chicago, Ickes on November 10 appealed to the public for voluntary curtailment of gasoline consumption.

The deficiency in supply brought out in Chicago was shown by OPC reports to be largely due to a slowing down of rail deliveries, which for the week ended October 31 averaged only 753,594 barrels a day with little indication of a quick return to the 850,000-barrel level touched a few weeks ago.

Receipts by tanker are sporadic, vary widely from month to month, and are not to be depended upon, and pipe line deliveries are limited and will continue so until the "big inch" line is completed to the coast next summer; even then, the amount of oil from the line which will be available for civilian consumption will depend upon the military demand.

In his appeal for voluntary cooperation, the coordinator disclosed that great

quantities of aviation and motor gasoline, lubricants and other oil products have been required for the North African occupation, and emphasized that oil is a vital factor in the conduct of the war.

"At the critical moment in the last war," he said, "Premier Clemenceau appealed to President Wilson for additional supplies of oil in a message which contained the following words—'Petrol which is as necessary as blood in the battles of tomorrow.' The supplies Clemenceau asked for were sent and the Allied supply crisis was surmounted.

"Again our troops are on French soil and again their actions depend largely on the petroleum supplies we can carry to them, for now we fight a vaster war and this precious fluid lifts the wings of our planes, moves our tanks, our mobile artillery and the immense services of supply upon which modern armies depend.

"Only the high command knows the number of American fighting men who have landed in Africa; the number of planes, tanks, trucks, jeeps, and other motorized equipment which they landed with them. But this much we all know: it is a large and powerful force, fully equipped with the most modern weapons. The official communique has told us that. This is enough to let us know that its oil requirements will be enormous."

Emphasizing that our oil supplies are ample for all needs and that our oil fields and refineries can produce all that we require, the coordinator explained that the problem lies in the long distances which must be covered by our tankers in delivering the oil to the theatre of war.

Much of this oil necessarily moves from the Eastern Seaboard, and the limited transportation facilities into that area develop the bottleneck responsible for the present situation.

"We shall deliver these supplies as they are needed and where they are needed," he promised, "but this means we must devote every effort to that task, and failure to make every economy that will insure its performance would be nothing less than disloyalty to the cause we serve.

"The supply position on the Eastern Seaboard is bound up in this overall problem of transporting oil to Great Britain and to Africa. Our ability to meet the extraordinary military demands of these areas is largely dependent upon cutting down our own consumption here. Failure to do this may result in the failure of some American plane to fly at a crucial moment or of an American ship to sail at a critical time.

"For this reason—and surely there can be no more compelling one—I appeal to every citizen with all of the earnestness at my command, to adopt every economy possible. I plead with them to remember that every gallon, yes every pint, of motor fuel that is shipped into the East for non-essential purposes is taking just that much space in a tank car or a pipe line from some petroleum product needed for war.

"I beg of every driver of every motor vehicle that he remember that the possession of a ration coupon does not require him to use all of the gasoline which the coupon authorizes him to buy. I urge him to consider, instead, how important it is to his country that he make each coupon stretch just so far as possible. Even a little bit can help so much. Even a gallon a week, saved by each motor vehicle in the East, would mean some 11,000,000 gallons of transportation space free for the carrying of oil for the fighters for freedom."

Ickes held out the hope that completion of the "big inch" pipe line to the coast next summer may give some relief to civilians, but warned "we cannot even count upon that, not knowing what our military requirements will be by that time.

"Meanwhile," he urged, "pleasure driving must be given up and only the minimum of heat maintained. All possible conversions to coal must be made. In the case of gasoline, at least, it simply will not be possible to ship it into the East in the amounts which we have been shipping, and still have the transportation we shall need for mounting military demand. In other words, we need to reduce our civil consumption to the irreducible minimum, and it is my deep hope that this can be done voluntarily just as far as possible. Otherwise, I can see no way in which we can supply enough gasoline to maintain the present value of coupons.

"There may be privation and suffering this winter, but wars are not won without privation and suffering. Every one of us in the Eastern states should realize that waste of oil is a disloyal act, the waste of priceless munitions needed on the field of battle."

CANADA: Plans to consider Canadian requirements for oil and oil materials on the same basis as those of the United States were announced November 13 by the OPC.

The plan to integrate operations in the two countries was outlined by Deputy Coordinator Davies in a letter to Dominion Oil Controller G. R. Cottrelle, following conferences on the question, as being "in the spirit of the Hyde Park agreement and the Canada proclamation." Canada, he said, henceforth will rank on precise parity with the United States.

The procedure is now being developed to make the arrangement effective, and through it, Davies said, the following objectives will be secured:

"1. A closer community of interest betweenCanada and the United States on all subjects relating to petroleum.

"2. The inclusion of Canadian requirements for petroleum and petroleum materials with those of the United States for applications to, and allocations by, the War Production Board.

"3. The consideration of Canadian petroleum war plants as integral units of the United States war plant construction program and the scheduling of material deliveries in harmony with that program."

As a result of the new setup, it was said at the OPC, all Canadian applications for materials and for oil products will be processed, considered and appraised just as are similar requirements for the United States. Provision also has been made for Canadian materials requirements to be transmitted to the OPC by the Canadian oil controller for program determination, just as though they were United States requirements.

BIG INCH: First shipments of seamless steel pipe for the second leg of the "big inch" line are now moving from Ohio to various points along the right of way, it was announced November 13 by the OPC.

A contract covering the first 360 miles of pipe was awarded by War Emergency Pipelines, Inc., to the National Tube Company on October 30, within 48 hours of the allocation of steel for the line by the WPB, it was stated by Deputy Coordinator Davies.

The prompt conclusion of the contract, he said, permitted the company to maintain uninterrupted fabrication of 24-inch pipe. Pipe for the remainder of the line will be ordered at a later date, but in such a way as to permit the company to turn it out without interruption.

Davies said the 215,000 tons of steel necessary for completion of the line from Texas to the East Coast will carry an AA-3 priority rating, sufficiently high to insure continuous delivery of pipe and equipment when construction gets under way before the end of this month.

The first leg of the line, Davies said, is going forward at the rate of 5½ miles

a day and, barring adverse weather, the project should be completed early in December.

☆

PRICE RISE: An increase of three-tenths of one cent per gallon in the price of No. 2 fuel oil for the Minneapolis-St. Paul area was authorized by the Office of Price Administration November 13 as a result of a showing that the Minnesota industrial center would suffer a severe shortage unless steps were taken to compensate the companies for higher transportation costs.

Much of the oil for the area formerly was delivered by barge, but many of the boats have been taken out of the service, and the companies were under increased expense for transportation, it was stated.

☆

CERTIFICATES: Requirements of the Office of Defense Transportation that all commercial motor vehicles secure certificates of necessity by November 15 have been amended to provide an additional 15 days in which operators may secure their licenses.

Postponement of the effective date of certification was decided upon to make the ODT mileage rationing program coincide with the OPA's nationwide gasoline rationing, but at the same time will afford a period of grace for thousands of operators who failed to submit their applications in time for processing under the original arrangement.

☆

WAGE-HOUR: Provisions of the Fair Labor Standards (Wage-Hour) Act were extended to contract well drillers November 9 by a seven-to-one decision of the Supreme Court.

Specifically, the court held that employes of the Warren-Bradshaw Drilling Company were entitled to receive payment for all hours worked in excess of 40 per week at the rate of one and one-half times the pay actually received, affirming a decision of the Fifth Circuit Court of Appeals.

The company contended that the employes were hired, at rates of pay running as high as $11 per day, with the understanding that they would work eight hours a day, seven days a week, until the drilling of the well was finished, and that the pay rates were fixed to be more than sufficient to provide for a basic wage scale and time and one-half for overtime.

Delivering the majority opinion, Associate Justice Frank Murphy upheld the contention of the employes that the work of drilling a well constituted production of goods for interstate commerce and therefore was covered by the wage-hour act, basing that finding on the evidence that the well was connected to pipe lines, some of which were with oil companies operating on a national scale, and some of the oil ultimately found its way into interstate commerce.

Dissenting from the majority opinion, Associate Justice Owen J. Roberts declared that well drilling had no connection with interstate commerce and intimated that, on the basis of the majority position, there was practically no limit to the application of the act.

"The labor of the man who made the tools which drilled the well, that of the sawyer who cut the wood incidentally used, that of him who mined the iron of which the tools were made, are all just as necessary to the ultimate extraction of oil as the labor of petitioners," he commented. "Each is an antecedent of the consequent—the production of the goods for commerce. Indeed, if petitioners were not fed, they could not have drilled the well, and the oil would not have gone into commerce. Is the cook's work 'necessary' to the production of the oil, and within the act?

"I think Congress could not and did not intend to exert its granted power over interstate commerce upon what in practice and common understanding is a purely local activity, on the pretext that everything everybody does is a contributing cause to the existence of commerce between the states, and in that sense necessary to its existence."

☆

RATIONING: Delays in the transportation of forms and books necessitated issuance by the Office of Price Administration November 10 of an order postponing the inauguration of nationwide gasoline rationing from November 22 to December 2.

The OPA explained that the wartime transportation system had proved unable to move the more than one-third billion pieces of printed matter necessary for the rationing, on scheduled time and a number of local boards would not secure their supplies in time to permit registration of motorists on November 12-14, as planned. In districts where forms have not been received, boards were authorized to postpone registrations to November 18-20.

From the standpoint of motorists outside the currently rationed area the postponement was a double windfall, since it gave them 10 days more of unrestricted driving and would give them something over four gallons of gas more during the initial ration period than they would otherwise have secured, the latter as a result of a decision by the OPA not to tear coupons out of ration books to cover the ten-day period.

☆

SULFONATES: Petroleum sulfonates were put under immediate allocation and use control by the War Production Board November 10, to conserve supplies disclosed to be inadequate to meet military requirements.

A by-product of white oil production, petroleum sulfonates recently have come into heavy demand because of their properties in industrial cutting oils, lubricant additives for high-compression engine oil, rust preventives, emulsion type paint, fat splitting, and emulsion breaking, the WPB explained. There is also, it was said, necessity for "substantial" export shipments.

The order prohibits any producer from selling, delivering, using or refining any petroleum sulfonate, or any person from accepting delivery except when specifically authorized by the WPB, which will direct the delivery and use of all sulfonates on hand. The only exception to the restrictions will be in the case of 50 pounds or less in a month when the receiver has not received an allocation.

☆

TUBULAR GOODS: An official inventory of all idle or surplus oil country country tubular goods in the possession of American operators either in the United States or Canada has been initiated by the OPC as a preliminary to its redistribution.

Formal orders approved by the WPB will require approximately 10,000 oil and gas operators to file reports with the OPC materials division of the district office for the area in which the materials are located.

Every operator filing a report showing material available for redistribution will be assigned a serial number.

Operators needing equipment will be authorized to purchase their requirements of tubular goods for any approved work program from holders of idle or surplus material. Any operator failing to file his report will be denied authority to acquire or use any material whatever for oil or gas production.

The program was undertaken with the approval of the inventory redistribution branch of the WPB, which will supervise it, and the OPC warned that any unusually large inventories held in the oil industry might be requisitioned by the WPB for use in the manufacture of essential war products by other industries.

[*Continued on page 53*]

Cooperative Action on Part To Help Win War, Ickes

Coordinator Emphasizes that Free Enterprise Is Most Desirable Situation in Peacetime; Davies, Boyd and Eastman Speak at Session

ALTHOUGH told that competition must be tempered at present to military requirements, and warned that additional steps toward cooperative operation are certain to come, free enterprise was singled out as the desirable situation for proper functioning of the petroleum industry in peace times at the general sessions of the twenty-third annual meeting of the American Petroleum Institute in Chicago last week.

The assertion that free enterprise was considered essential for the proper and efficient conduct of the industry drew particular attention because it came from none other than Harold L. Ickes, petroleum coordinator for war. It was made after he had heaped praise upon the industry for the extremely fine spirit of cooperation it has displayed and had expressed himself as being familiar with the general belief throughout the industry that he intended to become an "oil czar" when first appointed by President Roosevelt. Ickes also made a plea in behalf of the small units within the petroleum industry and urged men who represent the larger concerns to strive to avoid casualties of the smaller operators.

Davies Outlines Problems

The declaration that the industry, for the duration, is faced with an unparalleled job in which it will be necessary to give up the normal competitive order came from Deputy Petroleum Coordinator Ralph K. Davies, who outlined a number of the problems confronting the industry in meeting an increased consumptive demand with insufficient equipment.

In his annual address, William R. Boyd, Jr., Institute president, singled out the effectiveness of free enterprise and called upon the industry to justify its privilege of having their right restored by so adjusting its affairs to the war effort that the right will be won.

Vigorous opposition to the imposition of higher gasoline taxes, which may be proposed to offset reduced government revenues because of rationing, and to the entire idea of subsidies as a means of encouraging wildcat drilling for new reserves, and a forcible recommendation that the 40-hour week be suspended for the duration in the interest of conservation of manpower were made in resolutions adopted by the Institute's board of directors.

The 1943 annual meeting of the Institute will be held November 8 to 11 in the Palmer House, Chicago. The dates and place for the mid-year meeting, if held, will be decided later.

Harold L. Ickes, petroleum coordinator for war, came before the American Petroleum Institute as an exponent of the system of free enterprise and outlined a problem that threatens that way of doing business so far as the petroleum industry is concerned. After discussing the history of the setting up of the Office of the Petroleum Coordinator and citing the fears that existed as to dictatorial policy, his position was thus stated:

"But it just happens, in spite of what has been said to the contrary, that I believe in the American system of free enterprise. It just happens that I also believe that oil can best do its part in wartime with the least possible direction, and the least possible interference by the government."

He outlined the setting up of the Petroleum Industry War Council and other groups from the industry, which work with the coordinator and his staff. Accomplishments of the industry under this relationship, especially in providing such products as 100-octane-aviation gasoline were cited as evidence of the soundness of the organizations that function to assure petroleum products.

Other than early figures on aviation gasoline production he had no figures but he did class the accomplishment as a near miracle. He said that output of this grade of gasoline from existing refining equipment had been increased by 50 percent.

The test of free enterprise came in his outline of the directive by which marketing properties of oil companies have been pooled to obtain more effective distribution. About this he said:

"Now your industry is in process of taking the most revolutionary step of all, the abandonment of the hard-hitting, prodigal practices of peacetime free competition and the inauguration of a far-reaching program of what might be called 'unitization' of industry operations. This means that competing companies will share or jointly use many of their facilities and resources, including their transportation terminals. It unavoidably will mean a submergence of individual identities at many points for the duration of the war.

"This is not an adventure which either the oil industry or the Office of the Petroleum Coordinator view with happiness. It is, nevertheless, a step which both your industry and my office recognize as an inescapable consequence of the shortages in materials and manpower which was has created. In fact, even more striking to my mind, is the fact that the industry is doing it voluntarily. You are starting out on this uninviting experience—not because you were arbitrarily ordered to do so—but because your representatives and ours sat down together and decided that it was the course that had to be followed in the light of the realities of war and our determination upon victory.

At the last meeting of the Petroleum

# of Oil Industry Necessary Tells Petroleum Institute

Industry War Council this subject was discussed fully and frankly. It was thoroughly recognized by the Office of the Petroleum Coordinator, as it was by industry representatives, that some of the practices of our properly cherished system of free competition would be suspended under any program calling for joint use of facilities. But I wonder if there is not greater potential danger to the possible permanent loss of competitors than there is in the temporary minimizing of competition. To put it another way, I am more worried, from the long range viewpoint, about what is going to happen to the little fellow during this war than I am about whether the filling station dealer sells Koolmotor out of an Esso pump or vice versa.

"But I don't want to be understood, in saying this, as suggesting that I do not realize the problems that beset the larger, stronger operators, or that I lack sympathy with these operators. I simply mean to say that the peril to the small operator seems to me to be more immediate and his chance for survival more dubious.

"Of course, the essential quality of war is destruction—in the field, destruction of the enemy; at home, the destruction or loss of many things to which we have attached high values. Yet this destruction, paradoxically, is the means of preservation—preservation of the right to continue in what we know and cherish as our way of life. One of the zealously-guarded privileges of that way of life is the right of business men to compete, or if you will, the right of free enterprise. Now, of course I am familiar with the threadbare expression 'we are at war.' I am aware that it appears to be inevitable that the dislocations of this war will result in casualties in the oil industry, just as in other industries. I know, as everyone does, that the ever-mounting drain upon materials and manpower makes such consequences unavoidable. But the point that I should like to make—and the plea I make to you men, especially those of you who represent the stronger elements of the industry, is this: let us not just stand idly by and allow casualties to occur if there is any way, without hampering the prosecution of the war, to prevent them from occurring."

The observation of William R. Boyd, Jr., president of the Institute, on this development of wartime necessity was thus expressed:

"We are engaged in an all-out war testing whether this nation, with all its rights and privileges for the individual, can survive. So, while we are exposed to dangers from without we must submit to the application of many dractic rules and regulations that in time of peace we abhor and against which we would rebel in righteous indignation. We submit with some degree of cheerfulness, but altogether with patriotic passions that we may prevent convulsions of disunity within our ranks.

"The right of our own industry to survive this war period and have restored to us thereafter our right to function as a free enterprise in the accustomed way depends upon the degree of our unity and services, but it depends too upon our ability to provide and follow industrial leadership. Thus far we have met every test.

"For our industry we ask no special privileges. We do hold that men are never so apt to settle a question or problem rightly as when they are permitted to discuss it freely. Fortunately for us, this completely synchronized with the policy of the Petroleum Coordinator and his deputy. As for any other agency of the government having to do with any part of our destiny, we ask that it be not deaf to the voice of justice and that it cooperate with us to prevent any impact of the war from crippling our efficiency or our ability to do the job assigned to us."

Boyd reviewed the record of the industry during eleven months of war of which he concluded, "Thus far we have delivered the goods."

The long controversy as to the source of butadiene for the making of synthetic rubber was explained in his speech, as follows:

"The industry was widely subjected at one time to the charge of attempts to monopolize the production of material for the manufacture of synthetic rubber to the exclusion of grain alcohol as a source of supply for butadiene. The simple truth is that in the early stages of the synthetic rubber program of the government, only a few petroleum units had developed a formula and the 'know how' for making synthetic rubber and even those units only had pilot plants and small commercial units when the desperate need for rubber was first recognized. Because of this the agencies of government charged with the responsibility for finding new sources of rubber quite naturally turned first to places where the processes and the raw products for obtaining butadiene were known to be available."

On crude oil reserves, he said:

"The discovery of new pools of oil has not kept pace with the demand for crude oil. Drilling operations have been drastically curtailed and many informed persons in both industry and government circles fear that the draft on reserves will cripple the industry's ability to provide indefinitely the essential quantities of crude oil required. Certainly a situation does confront the industry that is frought with danger and one which should be critically examined by those in authority. Having this in mind, the Council, at its October meeting, adopted a resolution recommending a substantial increase in crude oil prices and corresponding increases in the wholesale prices of refined products in the retail prices to the ultimate consumer. This decision rests with the Office of Price Administration. The resolution also included a recommendation that necessary production materials and supplies be made available. The final decision about this rests with the War Production Board.

"The finding of new reserves is becoming increasingly difficult and all proper incentives should be offered the wildcatter to explore. It is an historic fact in oildom that price regulates the tempo of the wildcatter's drill and the chairman of the Council supports the aspiration of the industry expressed in the resolution. Compensatory prices

should be allowed and adequate materials made available to all producers."

Joseph B. Eastman, director of the Office of Defense Transportation, spoke hopefully of increasing tank car deliveries to the Eastern Seaboard above their present level when the 24-inch pipe line is completed, but declared that tank truck mileage would have to be reduced to save rubber.

"No one questions that there is a large opportunity for the saving of mileage and rubber in the use of the local delivery tank truck, Eastman said. No one questions that the formulation of practical plans for so doing is full of difficulties or that a plan adapted to one community is not likely to be equally adapted to another community where different conditions prevail. But the fact that difficulties are involved does not mean that they are insurmountable and still less that men who are as resourceful as petroleum marketers are well known to be, can solve them.

"The best and final plans can not be made immediately. Experience will continue to suggest improvements. But a start can and must be made at once, wherever it appears that a rubber borne mile can be saved. ODT has formulated a program for reducing the mileage of local delivery tank trucks. It has appointed committees to devise specific plans which can be approved from a transportation standpoint by ODT and from a legal standpoint by the Department of Justice. It is receiving the effective cooperation of the Office of Petroleum Coordinator in this effort. I urge all of you to cooperate."

Task Is Colossal

The task of "supplying the oil requirements of America and her allies" is colossal, Deputy Coordinator Davies declared. "There is every evidence that the future petroleum requirements for war, direct and indirect, will increase heavily from the present level. So far, the added war demand has been offset by the lessened non-war, civilian demand, but this is not apt to be the continuing experience. Particularly is this so when the peculiar characteristics of the product are considered—the fact that some of the most essential petroleum war requirements are by-products of primary distillation and cannot be taken directly from the base material."

To supply this prospective greater demand, Davies foresaw considerable difficulties. While producing rates might be increased in certain areas, as on the Gulf Coast, "they in general represent the maximum consistent with sound production practice. In certain fields they place a strain upon efficient capacity." No one seems to know how long we will continue to produce at current levels without damage to the properties.

On this point, Davies stated "there are a number of qualifications, but in general, I gain the impression that with a reasonable amount of new drilling we can, perhaps, feel safe with these rates for two years." Davies requested that everyone note the qualification "with reasonable amount of drilling."

Calling attention to the enormous war production program and the critical shortage of many basic materials, Davies declared "such confidence as I have as to our ability to obtain the minimum necessary for a drilling program of reasonable proportions is based more on what the industry itself can do than upon anything else. I mean the possibilities of reclamation in the oil fields and the emergency use of existing materials and equipment. I bank primarily upon the petroleum industry's ingenuity and inventiveness . . . but we shall be tremendously handicapped in doing the production job by reason of our extremely bad material shortage."

"On all sides now I hear the assertion that our reserve position is deteriorating, that something must be done to alter the trend," stated Davies. "Today I am sure that both government and industry agree something must be done to stimulate exploration and wildcat drilling. Various proposals have been put forward, some favoring price advances and other subsidies. We in the Office of Petroleum Coordinator for War see no necessity for governmental entry into the oil business. Time enough for that when private industry has failed to discharge adequately its responsibility to the nation. As to the practicality of the subsidy ideas that have so far been advanced, we are skeptical though ready to give the fullest consideration consideration to any proposal that promises a reasonable solution.

Price Situation

"The price incentive, we know, has a history to support it. Yet, in a controlled economy such as we have today, it is not the simple treatment it sounds. Traced from production through refining and marketing branches and considered in proper relation to the economy as a whole it presents about as complex a problem as can be imagined.

"Then there is more to the question of price than the need for stimulating exploration. The changed and changing costs of operation, capital requirements, and tax provisions all have significant bearing. At the moment I am not prepared to say more than that our office has made a special provision for the study of this price proposal with a view to presenting our position to the price administrator at the earliest possible date."

Suggests Change in Policy

After briefly discussing the downward trend in discovery rates, Davies said the situation "suggests to me the necessity for the industry proceeding now with the development of those good prospects" which it has already leased and has been holding until the right time. "It seems very likely that a mere change in development policy on the part of units within the industry would accelerate in an important way the discovery of additional reserves. And I suggest that such a change in policy is warranted in recognition of the national need.

"As time passes and the demands of war become more extreme," Davies asserted, "it is increasingly apparent that normal competitive order must give way to what we call unit operation. The only thing that is important is the necessity of defeating the enemy. Whatever contributes to it is desirable. In oil operations this means a banding together of normally separate and competing forces to the end that full advantage may be taken of the combined strength of all. Pooling, sharing, combining in operation as a unit, represent a necessary stripping for action in time of war."

After reviewing the functions of the several agencies of government, Colonel David G. Lingle, chairman, Aviation Petroleum Products Allocation Committee, paid this tribute to the industry.

"Let us see what the oil companies are doing to further the war effort and expedite its successful conclusion. Without a single exception, every company that is connected in any way with engineering, production, transportation or storage of petroleum and its products, is, one way or another, with the armed services in the air and on the front lines in all parts of the world. They are in the oil fields and along the far flung transportation lines. They are in the refineries and shops and are building new ones.

"Insofar as known to me, every member of the several governmental agencies who has anything to do with the oil industry is demonstrating by action, that there is no sacrifice too great. There is no question as to purpose, whether the sacrifice be in manpower, effort, time, energy or dollars and cents. This war must be won as quickly as possible to preserve our democracy, freedom and way of living. Gasoline and oil made flying possible. We've got them flying; let's keep them flying."

Producers Told They Must Do More With Less

OPC Representatives Declare Rates of Finding and Producing Petroleum Must Be Stepped Up

THE PRODUCING branch of the oil business must learn to do more with less, and at the same time step up the rates of finding and producing oil. This was the message brought to the Division of Production of the American Petroleum Institute at a group session of the twenty-third annual meeting that heard representatives of the OPC staff outline problems and conditions of the industry.

A picture of additional cuts in quantity of equipment made available to the industry, a slowing down of discovery rates to such an extent that producing ability is declining in the face of increased consumptive demand was painted. To counteract these undesirable trends they suggested the most careful use of materials, pooling of materials now in the hands of oil companies, more careful selection of drilling sites, elimination of production waste, improved reservoir production methods, more widespread use of substitute equipment and materials, and declared that it might become necessary to classify wells on the basis of their producing ability in order to procure equipment for the better wells.

The first speaker was E. DeGolyer, assistant deputy coordinator, who asserted that while the industry currently still retained the ability to produce larger volumes than being produced, that this surplus was being lost at a rate that indicates only a few additional months would see complete elimination of excess producing ability.

"We are losing reserves," continued DeGolyer. "Recent discoveries have not kept pace with production, and consequently, we are losing the capacity for increased production."

DeGolyer saw better production practices as the greatest single opportunity to increase reserves. He was referring to the use of conservation, in which physical waste would be eliminated, secondary recovery methods would boost ultimate recoveries, and in which there would be more extensive use of unitization. On the latter phase, he predicted that unitization would become far more important, as it represents savings of both manpower and critical materials. He suggested as a basis or formula for unitization agreements, that operators participate in production according to the number of saturated acre-feet underlying their respective leases. He also declared the burning of gas flares and excessive gas-oil ratios should be retarded.

D. R. Knowlton, Director of Production, OPC, reviewed the 11 months' history of M-68, showing by comparison how applications for exemptions had been speeded to the point where such papers are being handled currently. More than 3000 applications have been considered, some for single wells, others for as many as 60 wells.

(Complete text of Knowlton's address, page 20.)

One result of M-68 is that the industry in 1942 will drill 13,000 wells less than it did in 1941. Knowlton envisaged an even greater cut in the use of materials for next year, or about 50 percent of normal.

Forecasting further for 1943, the speaker indicated that selective drilling was bound to come, this being due to scarcity of materials. A nationwide survey, to determine what materials are available, is asked, to speed reclamation when required.

In closing, Knowlton referred to secondary recovery as a means for oil production which was well worth looking into, as an alternative to further development or search for new reserves.

Natural gas and natural gasoline in the war effort was chosen as subject by E. Holley Poe, Director, Natural Gas and Natural Gasoline division, OPC, who pointed out that while relatively small parts of the entire petroleum industry, they were extremely important. Indications were for a 25 percent increase over 1941 figures for production of natural gas. Since this material must be consumed within the United States, such increase denotes extending use of this fuel in war industries. Reserves must be developed, the speaker urged, to keep pace with augmented production.

(Complete text of Poe's address on page 28.)

Taking up the country by districts, Poe made recommendations as to how each might be developed to utmost participation in the forecast demand, citing certain developments already under way as indicative of further possibilities along similar lines.

Warning that the war emergency may cause many dislocations in operations, the speaker reminded that dire necessity may also teach much about better production methods, better transportation and distribution methods, better ways of conserving the product, and as well of preventing the economic waste of it.

Call up the reserves, urged William B. Heroy, Director of Reserves, OPC, likening the oil industry to a gigantic military operation to dramatize his plea for better understanding of the basic data concerning the Nation's reserves. He pointed out that the petroleum industry, unlike most others, is dependent upon an invisible stock of reserves which cannot be surveyed readily nor accurately.

(Complete text of Heroy's address on page 33.)

Reserves must be judged in relation to the requirements, and not solely on a certain amount of crude; to this must be added distribution, reserves nearer

centers of utilization being much more valuable than others at great distances. Heroy surveyed the different oil-producing areas, briefly recapitulating the reserves in each, and evaluating them in the light of factors already mentioned.

In closing, Heroy emphasized four points: make the most of our manpower; make the most of our materials; make the most of our information; and make more funds available for exploration. Only by utmost efforts in all four ways can the industry keep its reserves up to the increasing demands forecast for it in 1943 and years of the war to come.

Stressing the necessity of doing more with less material, G. W. Orton, Director of Materials, OPC, complimented the industry—both operators and suppliers—on the excellent spirit of cooperation shown in dealing with the OPC. He emphasized the responsibility of the materials division as being twofold: first, conservation of critical materials for essential uses only; and, second, assurance in every way possible of actual deliveries of critical materials when required.

Further, the speaker stated, the oil industry has a twofold responsibility: first, in being absolutely sure that the need covered by an application for priority cannot be filled elsewhere; and, second, to place all facts fully and completely before the division. This done, Orton advised coming back with a second request if the first were rejected, with any additional data which can help emphasize the need.

Of equal importance with prompt action is the fact that the division cannot permit the use of a single pound of critical materials when other less critical materials can answer or be made to answer.

Since reorganization, Orton stated, the majority of applications are handled within 24 hours, a clarification service and equally important expediting service being set up to insure against unnecessary delay or mislaid applications.

In December of this year the division plans to establish an inventory plan simple in form and streamlined to cover assembled and fabricated items. This will make such items available to other operators in emergencies.

Orton stressed the WPB's "Critical Construction Materials Design Guide," as a must item for every engineer to avoid loss of time in applying for materials which do not fall within the classification of his needs.

In closing, Orton stressed the need of working together, having as working background a bill of materials for the production division, for instance, which will cover the next 18 months requirements. Above all, he summarized the situation in the words, "We must learn to do more with less."

Major J. R. Parten, Director of Transportation, OPC, discussed pipe lines and war demands, as seen by government agencies concerned with deliveries of vital oil needs and those charged with maintaining such deliveries. Presenting figures on the East Coast demand, the speaker showed that present demands involve the moving of more than 300 million ton miles per day, or, expressed in barrels, a petroleum movement of more than two billion barrel miles per day. To substitute overland means for such a movement which formerly was almost entirely oceanborne, has burdened both resources and ingenuity of the industry.

(Complete text of Parten's address on page 22.)

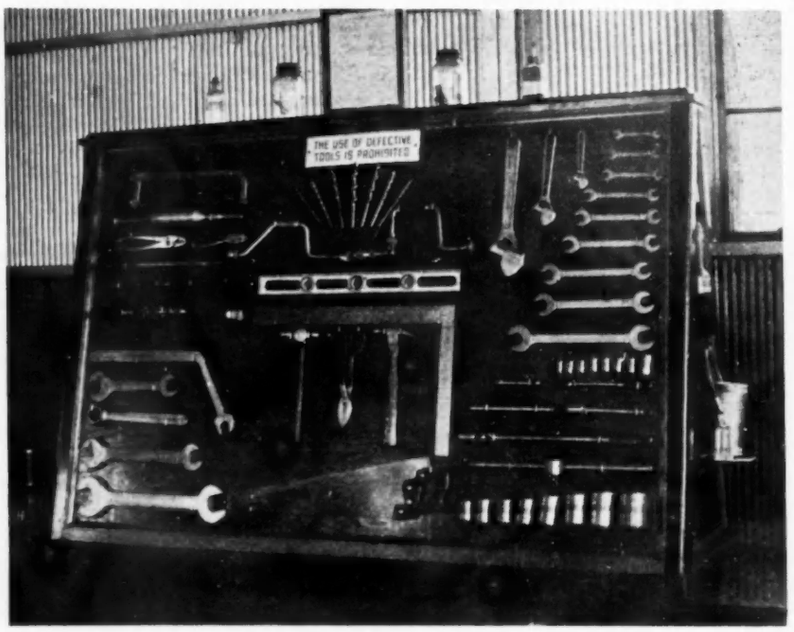
Comparing base route efficiencies for tanker service, Parten showed that barges could deliver about 50/100 barrels per day per ton of steel; tank cars 52/100 barrels; and the 24-inch pipe line as now planned, about 82/100 barrels; and if stepped up to 450,000 barrels per day, 120/100 barrels per ton of steel per day. Thus, while a tanker and the "big-inch" line are about equal in steel efficiency, difficulties of convoy, and other factors involved in seaborne traffic leave the large pipe line as most efficient method for long-distance movement.

Tracing the changes required in existing pipe lines to permit oil movement to reach projected lines such as the 24-inch, Parten demonstrated not only the need for the recently confirmed extension to Atlantic Seaboard, but also the demand for a second paralleling line of equal size.

New proposals, new studies, he pointed out, and new recommendations are being made all the time. New projects are under consideration, numerous rearrangements are already being made.

In conclusion, Parten said: "Our goal is to deliver overland approximately 1,400,000 barrels daily to the East Coast, both for essential domestic and critical off-shore demands. To accomplish our objective we have yet to gain 400,000 barrels per day. The only answer, in our judgment, can be the building of more pipe lines.

MAINTENANCE HINT



Display Board Boosts Tool Care

SINCE a worn or badly fitting wrench is a three-way hazard, to the wrench itself through concentrated stresses through improper fit, to the nut on which it is used through the tendency to round corners and render the nut unfit for further use, and to the user through the possibility of slipping off and causing injury, maintenance of tools in first-class condition is a prime requisite of prolonging equipment life.

A board on which tools are kept between periods of use enables inspection to be made readily, and emphasizes the condition of wrench jaws, chisel ends and other tools much more than the same amount of inspection would, were the tools thrown into a drawer or tool box.

Outlook for Crude Demand Good Despite Gasoline Rationing

By L. J. LOGAN, Associate Editor

DESPITE the substantial curtailment of civilian consumption of gasoline which will occur under national rationing of that product, it is indicated, paradoxically, that there will not be much if any let-down in the nation's requirements of crude oil after the rationing program goes into effect around the end of November.

On the contrary, greater rather than smaller needs of petroleum are indicated for the early future, upon putting together the known facts of the largely essential character of present heavy use, the increasingly evident prospect of enormous military use henceforth, and the constantly expanding capacity for transporting oils in the face of war-imposed handicaps.

To a greater extent than generally realized, perhaps, gains in military use of all products have compensated for the curtailment of civilian use of gasoline which already has occurred through rationing in the East Coast district and through voluntary reduction of motoring in tire conservation. Similarly, further expansion of military consumption may be expected to compensate largely for the additional reduction of civilian use to be involved in extension of gasoline rationing to hitherto unrationed areas, with essential civilian use of fuel oils, lubricants, and other products besides gasoline continuing heavy in the meantime.

(The Bureau of Mines reported that in the third quarter of 1942, total demand for all oils was within about 9 percent of that in the corresponding period of 1941, while reduced imports, increased exports, and additions to stocks of refined products resulted in a decline of only 3.5 percent in the demand for domestic crude, to 3,910,000 barrels daily from 4,051,000. The bureau estimated, further, that in the fourth quarter of 1942, total demand for all oils would be similarly down only 7 to 8 percent, with demand for domestic crude off 4 percent. For November, the demand for domestic crude was estimated at 3,930,000 barrels daily, off 4 percent from the November, 1941, actual.

(Total motor fuel demand, in reflection of curtailment of gasoline consumption heretofore, was about 17 percent lower in the third quarter of 1942 than in the like period of 1941, and is expected to show a decrease of possibly 15 percent for the fourth quarter; and the reduced motor fuel use is the primary factor in this year's lower demand for all oils.

(While December will bring the widened rationing, demand for gasoline in October and November has been above normal because of advance purchases and withdrawals to distributors' storage in anticipation of the new rationing program.)

So clearly outlined is the outlook for continued large and growing need for petroleum, that the principal matter for concern appears to be not a possible loss of markets for crude oil producers but a possible serious difficulty of producers everywhere in the country in meeting requirements. For a limited time, there may be setbacks in demands for crude from certain fields when extended gasoline rationing is applied. But such decreases in demand will be temporary.

As far into the war-clouded future as can be seen, the outlook is for heavy and growing needs for petroleum, the life blood of modern warfare. It is highly probable that producers who now want larger markets eventually will have more market than they can supply. Refineries will be called upon more and more for war-essential products, and plants that now are partially idling will be made to fit into the picture with more complete use of their facilities. Fields that currently are held back will encounter relaxing restrictions as they feed crudes into the busy refineries.

The oil industry now is confronted with a fuller realization of the significance of the words of the President of the United States in a prophecy of events to come. Speaking when American war production was only getting well started, the President described it as being at that time only a trickle but one which would grow into a rivulet and then into a large stream and finally into a great torrent that would engulf and sweep away the Axis.

Now it becomes clearer that this mighty war production of which the President spoke is production of machines and devices of war that will go into battle and remain in combat service only through the use of enormous quantities of petroleum, in its numerous forms. Fuels and lubricants must be used in surprisingly great amounts in the absolutely essential war time activities on the home front and in training modern armed forces; and upon those heavy needs are superimposed the vast requirements of the globe-encircling military activities, involving oils used by naval and supply ships, the planes that are increasing in number by the tens of thousands, and the tanks, army trucks, and other armored vehicles that come off assembly lines of mass production plants. Synthetic rubber, toluene for explosives, and numerous special lubricants are some of the important war products that must come from petroleum, but there are also many others not here named.

Any attempt to estimate the net effect of extended gasoline rationing must be made against this awe-inspiring outlook for petroleum demand; and thereupon the temporary loss of gasoline market does not appear a very serious problem for the seller of crude.

Actually, the producer may hardly feel the rationing program, as it is indicated that refineries will be obliged to continue running about as much crude in the immediate future as they have been running in the recent past, regardless of the volume of gasoline demand, in order to produce the war products that must be supplied.

It is of only secondary importance if such maintenance of runs at levels dictated by needs of war products results in production of other less essential products in quantities not exactly fitting the nation's needs. If a by-product of war product refining is more gasoline than needed under rationing, then the result may be a piling up of surplus gasoline, but it cannot be a curtailment of crude runs to stills, because the war products and not the gasoline come first and determine the refinery throughput.

Actually, it is indicated that there will not be henceforth any substantial surplus of gasoline even under rationing and with refinery runs undiminished if refiners will, in effect, turn the gasoline

saved by rationing into fuel oils, of which there are substantial deficiencies.

Heretofore, supplies of both heavy and light fuel oils have been much too short for convenience and safety, and future needs of those products will require not only comparatively large production for current use but also building up of depleted stocks.

Extended gasoline rationing can be met, along with increased demand for other products, it has been calculated, by reducing the average refinery yield of gasoline to 35.2 percent as compared with 45.3 percent for the heating season of 1941-1942. At the same time, it is recommended, the yield of residual fuel oil should be increased to 27.2 percent from 21.7 percent, and kerosene and distillate to 23.2 percent from 20.3.

When nation-wide rationing of gasoline goes into effect, the civilian consumption of that product will be off nearly one third from normal, although about one half of that curtailment already has occurred under rationing in the East and tire conservation in the rest of the country, leaving the remainder to be brought about through the extension of rationing to passenger cars throughout the country.

Offsetting the declines in civilian use of gasoline to a material extent in the meantime, however, will be greatly increased military use. And while extended rationing will narrow the market for gasoline, much larger quantities of other products will be required at the same time in at least partial compensation, with the result that the recommended changes in refinery yields should largely solve the industry's problem of keeping production of products balanced with demand for them.

It has been stressed, however, and now the need for such emphasis is urgent, that government price control authorities immediately adjust prices of petroleum products, so as to make the changed yields possible without serious financial loss to refiners. The fuel oils are materially lower-priced than gasoline, and since the industry must, in effect, turn gasoline into fuel oil, then it must receive better prices for the fuel oils or eventually become bankrupt.

Unless price schedules are adjusted, they will be unquestionably a serious deterrent to realization of the needed changes in refinery yields; and the result to be expected is that refiners will only partially effect the changes, leaving gasoline yields too high and causing accumulation of surplus gasoline, while production of needed fuel oils continues inadequate. Such accumulation of a large surplus of gasoline would be physically possible from the standpoint of storage facilities, at least for a few months, as gasoline stocks in the storage tanks currently are around their lowest point reached during the large consuming season of 1942. As shown in an accompanying table, United States stocks of finished and unfinished gasoline totaled about 79,000,000 barrels on October 31, whereas they amounted to 107,000,000 barrels on March 14, 1942. Therefore, although there will be no need next spring for gasoline stocks equaling those of last spring, there would be available the tanks for storing a similar volume, or about 28,000,000 barrels more than now held. Furthermore, refiners could gain even more storage space for gasoline, in an emergency of overflowing tanks of gasoline, by cleaning out depleted gas oil and distillate fuel tanks as the heating season progresses and brings drafts on stocks of the light fuel oils. Stocks of gas oil and distillate fuel in the United States currently total about 48,000,000 barrels, but if they should decline by next spring to the levels of last spring, they would decrease nearly 18,000,000 barrels, or almost to 30,000,000 barrels; and the emptied storage could be used for gasoline.

It is to be expected, however, that the Office of Petroleum Coordinator would interpose before any large surplus of gasoline accumulated and before any critical shortage of fuel oils arose.

Consequently, it is now anticipated in some quarters that the next few months may bring a tightening up of control of refinery operations. It is forecast that the petroleum coordinator soon may be telling each plant owner how much of each petroleum product he may make each month, with due consideration of the equipment and facilities of each plant.

Those who anticipate such action feel, however, that the government never could justify its action on the basis of present ceiling prices, and that the move would be accompanied by compensatory adjustments of prices.

While impending general rationing of gasoline foreshadows no material change in refinery crude runs and volume of demand for crude production, it also does not raise the likelihood of any substantial readjustments of the takings of crude from different districts and pools. Some producers of low gravity crudes have felt that the de-emphasizing of gasoline and emphasizing of fuel oils might cause refiners to seek lower gravity crudes in substitution for the lighter crudes of relatively large gasoline content. But inquiry among refiners uncovered little or no justification for such expectations. The less efficient and flexible plants already are obtaining relatively low yields of gasoline and will continue to obtain those yields without reaching the average to which the industry as a whole is asked to come down. The plants which will have to achieve the reductions in gasoline yield are those with better equipment and greater flexibility, and while it might be advantageous for them to resort to cheaper, lower grade crudes from the standpoint of production of gasoline and fuel oil, they generally are heavily engaged in production of war products, which they can best make from the crudes they currently are purchasing, affording good yields of high octane gasoline and light fractions needed in making war materials.

While there is not indicated any perceptible change in requirements of

[*Continued on page 31*]

Available Storage Tanks Would Permit Storing of Large Surplus of Gasoline

Stocks of finished and unfinished gasoline could increase 28,000,000 barrels before reaching proportions of last spring, and large space in which surplus gasoline could be stored will be made available if light fuel oil stocks are depleted during winter to level reached last spring. Stocks of residual fuel oil not greatly changed from last spring.

(Thousands of Barrels)

State or District	Stocks of Finished and Unfinished Gasoline			Stocks of Gas Oil and Distillate Fuel			Stocks of Residual Fuel Oil		
	March 14, 1942, (All Time Peak)	October 31, 1942	Indicated Storage Made Available Since Last Spring	April 11, 1942 (Near Lows for Year)	Oct. 31, 1942	Indicated Storage That Would be Made Available by Drawing Stocks Down Next Spring to Same Levels Reached Last Spring	April 11, 1942 (Latest Available Published Data by All Districts)	Oct. 31, 1942	Indicated Storage Made Available Since Spring
East Coast	18,043	.....	.....	6,261	.....	.....	5,896	.....	.....
Texas Gulf Coast	21,934	.....	.....	7,154	.....	.....	7,906	.....	.....
Louisiana Gulf Coast	4,728	.....	.....	1,312	.....	.....	1,483	.....	.....
No. Louisiana-Arkansas	1,287	.....	.....	115	.....	.....	212	.....	.....
Inland Texas	3,835	.....	.....	105	.....	.....	1,042	.....	.....
Sub-total, East Coast–Southwest	49,827	37,797	12,030	14,947	25,953	11,006	16,539	19,739	*3,200
Appalachian	3,914	2,685	1,229	361	777	416	643	470	173
Ind., Ill., Ky.	23,058	13,752	9,306	2,596	6,325	3,729	3,569	2,940	629
Okla.-Kansas-Mo.	10,492	6,235	4,257	811	1,904	1,093	1,764	1,373	391
Rocky Mountain	2,513	1,643	870	264	424	160	596	570	26
California	17,425	17,047	378	11,623	12,947	1,324	59,415	54,468	4,947
Total United States	107,229	79,159	28,070	30,602	48,330	17,728	82,526	79,560	2,966

* Amount storage filled.

LIBERTY

versus

Compulsion

We are engaged in the greatest war in history—to determine whether our nation and other nations founded on liberty and the dignity of the individual shall endure.

The struggle is between two totally opposite ideologies. One is based on brute force, the top gang keeping its power by compulsion. The other is based on logic and persuasion, the leaders obtaining office by vote and remaining there only by the consent of the governed. Under regimentation creative research congeals and the masses produce and fight as sullen slaves. Under democracy creative research is stimulated and mass production multiplies. Soldiers go to battle with unbeatable spirit because of the determination of free men to maintain that priceless gift which they have won after ages of fighting and which they will never give up . . . the gift of liberty.

When the war is won and we return to peace time pursuits there will still be a big job to do in rehabilitating a broken world. People everywhere will look to America. Our business men and leaders will have a great responsibility and a great opportunity. In keeping with this thought the Mission Manufacturing Company is planning many advancements and improvements in its products for the benefit of oil men who will be busy to a degree never before experienced. In the meantime war comes first.

Buy Bonds for Victory
and to insure a strong and stable United States when the war is over.

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Rotary Slips—Mission Swabs—Mission Plug Valves

A Year of M-68

By D. R. KNOWLTON
Director of Production, Office of Petroleum Coordinator

THERE are two or three things which I would like to take this opportunity to discuss.

First, I should like to review the 11 months' history of Conservation Order M-68. You will recall that in the early fall of 1941 we, in the petroleum industry, were given to understand that those engaged in the production of petroleum would have to reduce our steel consumption during the year of 1942 at least 40 percent below the 1941 consumption. It was proper that the Office of Petroleum Coordinator should be the agency charged with the responsibility of rationing the 60 percent of the steel to be made available. There were three ways in which it could be done. Some felt that the available steel should be directly allocated, joint by joint and valve by valve, to those wells and other uses which OPC and the War Production Board deemed entitled to the material. Others suggested that spacing rules for every field in the country should be written. The view of the Office of Petroleum Coordinator, and the view which finally prevailed, was to establish a countrywide rule governing the use of materials with a provision for exceptions where it was shown to be appropriate that an exception be granted. Conservation Order M-68 was the result.

Presented before the Division of Production, before the Twenty-third Annual Meeting of the American Petroleum Institute, Chicago, Illinois, November 12, 1942.

Applications Expedited

You will remember how slow we were in disposing of the early applications for exception. Several of us joined the OPC staff about the time the order was issued, and had to be indoctrinated with a new way of doing business. Applications for exception to the order were pouring in faster than we could handle them. Some of the cases were extremely difficult to judge, and about that time I began to understand and appreciate the trials and tribulations of our friends, the regulatory authorities, who sit in judgment on the various petitions of the industry. We did, however, get started finally, and after several weeks we managed to handle the cases on a current basis. Since then we have handled the cases currently, but I have discarded the hope expressed at the Dallas meeting of the American Petroleum Institute that a one-week service could be inaugurated. Ten days to two weeks seems to be our lower limit.

Since the order was first promulgated, we have handled over 3000 applications. Some have been for one well only, some have been for as many as 60 wells, and other applications have covered the installation of pumping equipment or the changing of production facilities on one or more wells. Of the applications filed shortly after the promulgation of the order, approximately 50 percent were denied. As the principles which governed the "office" in passing on the applications for exceptions were evolved and became known to the industry, the percentage of the applications which were approved increased. Presently, there are fewer applications being filed, and of those which are filed approximately 90 percent are being approved. When the year is done, the year's use of steel will be within 1 percent of the quota set—60 percent of that used during 1941.

Half a Million "Block-Busters"

The manner in which the producers of the country react to Conservation Order M-68 is, in my opinion, a splendid testimonial to the way the oil industry cooperates any time a sacrifice is needed to get a job done. The patience and understanding, and the help tendered by all elements of the industry, major companies and small independents alike, were extremely gratifying to us at a time when we needed all the help available. I want to thank you for your patience.

As a result of M-68 the industry, in 1942, will drill 13,000 less wells than normally would have been drilled. The steel which would have been consumed in equipping these wells is sufficient to build 26,000 fighting tanks. This quantity of steel will build half a million—half a million—of the 2-ton "block-buster" bombs which are so tormenting to the unholy triumvirate these days. If you ever get to wondering what your contribution to the war program has been, think of these figures—26,000 tanks—half a million "block-busters!"

Material Use Cut

This coming year you will be called on for an even deeper cut in your use of materials. Our analysis indicates, however, that if we are to carry out those production operations which we deem to be essential in order to safeguard our oily supply, it is our opinion that the cut should not exceed 20 percent under this year's consumption. This will bring us down to about 50 percent of normal. The War Production Board will have the tremendous responsibility of distributing the available steel to the war plants and essential industries. In our dealings with the War Production Board, we are spreading every card on the table—face up. There has been no attempt to exaggerate our needs. Plain facts, in plain words, has been our theme.

Selective Drilling

Selective drilling is bound to come. And when it does, you will find drilling in some areas spread out to one well to 160 acres—maybe more—just enough drilling to define field limits and let us know how much oil we can plan on recovering. Materials are just that scarce.

Nationwide Survey

In anticipation of the time when it may become necessary to scrape the "bottom of the bin," we have recently asked the industry, through its district production committees, to undertake a nationwide survey of its production facilities to determine what quantities of materials may be reclaimed from those facilities and devoted to other uses, preferably without jeopardizing ultimate recovery of reserves.

Wells Classified

In a manner of speaking, we are asking the petroleum industry to do with its productive facilities what the selective-service system has done with the

[*Continued on page 58*]

"FOR the want of a nail . . ." the shoe, the horse, the rider, the battle, the war, and even the kingdom, were lost. So goes the old schoolbook legend which points to the importance of little things in the achievement of big things.

Today, it takes DETAILS — *millions* of details! — to arm a war-winning nation. None is so trivial that it can be completely ignored.

The oil industry has its vital details. And filing operations are by no means the least important. Take drilling: Rig up, pipe fitting, tool sharpening, pump, engine, drill works and draw works repair — all call for the frequent use of files.

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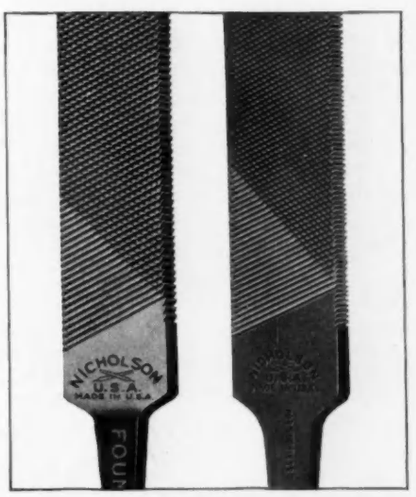

Two Useful Oil Industry Files

(Left) *For Foundry Castings, heavy pipe, etc.* Designed for rough filing beyond the service expected of regular files. Has extra-sturdy teeth with heavy-set edges — to resist shelling and breaking out when assigned to such tough jobs as removing fins, sprues and other hard projections; for fast roughing down of pipe; or other rough filing.

(Right) *For Stainless, Molybdenum and other extra-hard alloyed steels* used in oil-field equipment, ask your supply house for Nicholson or Black Diamond Special Files for Stainless Steel. Special tooth construction resists the abrasive action of the hard chromium carbides and nickel alloys . . . does a job for which ordinary file teeth are not designed.

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Pipe Lines and War Demands

By J. R. PARTEN
Director of Transportation, Office of Petroleum Coordinator

THE oil industry and the government have joined hands in an enormous program to substitute overland for that which was normally ocean transportation. This effort necessarily has called for greatly increased pipe line facilities, and we are today in the process of carrying out that program with all possible haste.

War demands have taken from our shores most of the tank ships which in peace time furnished the major part of our petroleum transportation, measured in ton mile deliveries. The Pacific Coast has been affected, but because of shorter distances and lesser volume, it has not been affected as violently as has the East Coast. The normal East Coast delivery route of some 2200 miles, together with a required daily delivery of something of the order of 1,400,000 barrels, has presented the principal problem in our readjustment program.

We can best grasp the size of this East Coast problem by a realistic view of the volume and distance involved. If we forget about the normal ocean route and limit ourselves to the overland distance involved between the oil sources in the Southwest and the center of consumption on the Eastern Seaboard, we are dealing with a distance of some 1500 miles. If we apply to this mileage the objective volume of 1,400,000 barrels of petroleum per day, or some 200,000 tons per day, we have before us a movement approximating 300,000,000 ton miles per day. Expressed another way, it is a petroleum movement in excess of two billion barrel miles per day. To substitute overland means for such a movement that was normally nearly all ocean, has of necessity, heavily burdened both the resources and the ingenuity of a great industry.

Naturally, we have turned to tank cars, tank trucks, barges, and pipe lines as the expansible methods through which to accomplish this transformation. During the past six months, in the selection of methods, the expansion of which would best serve our objective, many controversial questions have had to be resolved. We have employed certain fundamental principles in appraising these methods. We have applied the rules of the least time required and the least expenditure of critical materials. In an expansion of facilities, we have recognized that more tank cars would require more locomotives; more barges would require more power boats, more canals and canal improvements; more pipe lines would require more available power; more tank trucks would require more rubber and manpower. We have been required, moreover, to weigh all these in terms of steel and horsepower against the increased building of tank ships and related convoy equipment.

Presented before the Division of Production, before the Twenty-third Annual Meeting of the American Petroleum Institute, Chicago, Illinois, November 11, 1942.

In our evaluation, we have related all these methods of movement to a standard base route, long since used, from the Texas Coast to New York Harbor. Steel and power efficiencies become the controlling factors in our selection of the most desirable expansible method. We found in our calculations that over this base route we could depend on barges to deliver about 50/100 of a barrel of oil per day per ton of steel. Tank cars would deliver 52/100 of a barrel of oil per day per ton of steel. A large pipe line, the 24-inch, on the basis of 300,000 barrels per day would deliver about 82/100 of a barrel of oil per day per ton of steel. At a stepped-up capacity of 450,000 barrels per day, this line would deliver 120/100 barrels per day per ton of steel.

It was found that while the tank ship was about equal to the large pipe line, in steel efficiency, the convoy equipment required and other uncertainties governing tanker availability removed this method from consideration. It was found that tank trucks could make their best contribution as a substitute for tank cars on the short hauls, leaving the cars available for the long East Coast movement.

From a standpoint of power, a large pipe line stands out as the most efficient method for long distance movement. While more barges have been made available within the limits of existing power equipment; and while the effectiveness of tank cars has been greatly increased by methods to speed up turn-around; and while increased pipe line movements have been and are being accomplished by rearrangement of existing pipe lines; it became obvious sometime ago that one or more large pipe lines to the Eastern Seaboard was a vital necessity.

I know that many public references to pipe line activities have been made, and you are probably familiar with them. It seems opportune, however, to note just what has been accomplished thus far and look ahead to see what can be done during the coming months.

I do not need to emphasize the important part which has been played by pipe lines in the evolution of the oil industry. Commencing in the latter part of the 19th Century with a few short lines in Pennsylvania serving nearby refineries, the total mileage in gathering, tributary and trunk lines in the United States has grown to nearly 128,000 miles. The investment in these lines is approximately one billion dollars. Currently, there are some four million barrels a day of petroleum and petroleum products being delivered to refineries and terminals through these lines. This enormous volume of oil is moved underground invisibly and so quietly that we are prone to overlook the magnitude and importance of this mode of transportation.

Pipe lines in the past have been considered primarily as essential plant facilities for affiliated refineries in a highly integrated industry. Refining interests have almost always supplied the initiative and the capital for the construction and extension of pipe lines. They have done this in order to assure adequate supply of crude oil to meet manufacturing requirements.

With the advent of the war, however, pipe lines have assumed a greater im-

portance in our national transportation system. Instead of serving essentially as plant facilities, pipe lines are now called upon to transport oil and its products over longer distances to meet military, industrial, and essential civilian requirements.

The whole pattern of our pipe line system has had to be changed in order to perform these functions. Nor has it been a matter of making a few changes: it has involved many rearrangements and extensive construction and relocation. The program is well along the way toward completion and many alterations have already been made. But there still remains a great deal more to be done to accomplish our major objective.

I will not attempt to mention the many elements of this program to increase pipe line transportation. The oil industry and the Office of Petroleum Coordinator have worked together consistently to maximize pipe line capacity, making the greatest use possible of critical materials and manpower. Many proposals have been submitted, and numerous studies have been made in the endeavor to deliver by pipe line in the shortest span of time every barrel of oil possible to the places where it is needed most.

The large refining centers east of the Rocky Mountains, as you know, are in the Gulf Coast, the Middle West, and the East Coast areas. During times of peace, most of the pipe lines in Texas carried oil in a southerly direction to the refineries on the Gulf Coast. Products were then shipped by tanker to the Eastern Seaboard. Pipe lines in Oklahoma and Kansas transported oil northeasterly to refineries in the Chicago-St. Louis area and products were manufactured and distributed throughout the Middle West.

Although a small volume of crude was moved to the Atlantic Seaboard by pipe line, most of the oil was brought there by tanker and refined for distribution along the East Coast. This general scheme of pipe line transportation is necessarily being rearranged. While some crude lines will necessarily still carry oil to the Gulf Coast, some of these lines have been taken up for use elsewhere and four others are being reversed for the movement of oil in a northeasterly direction. Many of the crude lines from the Southwest and Mid-Continent areas are being enlarged in capacity. Products lines have been reversed and others have been increased in capacity in order to provide the Atlantic Seaboard with supply.

A comprehensive pipe lines relocation and extension program was adopted by the Office of Petroleum Coordinator in the spring of this year. The program called for the extension of existing lines, the reversal of others, the building of loops, the installation of additional pumping stations, and in certain instances, the construction of new lines.

The plans called for taking up and relocating some 1700 miles of second-hand pipe, laying a total of 2357 miles of new line, reversing and converting 2800 miles of other lines, and installing considerable pipe line equipment and storage facilities. The program called for maximum use of second-hand material. Recommendation No. 49 was issued on May 11, 1942, by the Office of Petroleum Coordinator, in order to further this program. Management and Engineering Subcommittees were appointed for each of several recommended projects.

Units of some of the projects have already been finished and placed in operation. Included among these are the reversal and conversion of a Texas Company pipe line between Port Arthur and Dallas; the reversal and conversion of the Keystone Line across Pennsylvania; the enlargement of the Shell line from Wood River to Lima, Ohio; reversal of the Sun-Susquehanna line from Cleveland to the Eastern Seaboard; and the enlargement of the Texas Empire line between Tulsa and Chicago.

In California, the 24-26-inch Stanpac Natural Gas Pipe Line, extending from Kettleman Hills to San Francisco, has been converted to crude oil service. This line now provides transportation for 100,000 barrels of crude oil daily to refineries in the San Francisco Bay area. All the projects under the relocation program were scheduled for completion before the end of the year, but delay in procurement of necessary materials will cause some of the completions to be made after the first of the coming year.

I should like to touch briefly on some of the projects which are now in the process of construction. Starting with products lines, we are increasing the capacity of the existing Plantation line from Baton Rouge, Louisiana to Greensboro, North Carolina. In order to provide the line with sufficient supplies, we are building a 60,000-barrel feeder line from Houston and Port Arthur to Baton Rouge. We are also constructing an extension to this line from Greensboro to Richmond, Virginia, from which point petroleum products will be moved still farther north and east by barge. The project will not only enable us to assist in supplying the southeastern states, but will also contribute 30,000 barrels daily to such points as Washington, Richmond and Baltimore.

A new line will soon be built across Ohio designed to deliver at Akron 15,000 barrels daily to the Sun-Susquehanna line destined for the New York-Philadelphia area. Pending the completion of this Trans-Ohio line, we are moving products to Toledo, then taking them by lake tanker to Cleveland, whence they are transported through the Standard of Ohio and Susquehanna lines into Pennsylvania.

A products line across Florida, with a carrying capacity of 35,000 barrels daily, is being constructed. Pipe for this project was procured by taking up the American Liberty line in Texas. The Florida line will extend from Carrabelle to Jacksonville. Products moved through this line will be transshipped by barge from Jacksonville, principally for the southeastern states.

The new Sinclair line across southern Pennsylvania to Steubenville, Ohio, is nearing completion. When this line is finished, it will carry products from west to east.

Another combination movement of products to the East Coast will be effected by reversing and converting to products a crude line between Port Arthur and El Dorado, Arkansas; reversing an existing products line between Port Arthur and Shreveport, Louisiana; building a short extension in northern Louisiana and connecting it to the Magnolia line into El Dorado; and constructing a new 155-mile line from El Dorado to Helena, Arkansas. This system will provide a movement of 55,000 barrels daily. Products will be transshipped from Helena by barge and tank car to points farther north and east.

The Great Lakes Pipe Line Company in the Middle West is also planning to enlarge its line between Kansas City and Minneapolis, in order to provide additional quantities of fuel oil and gasoline for the Northwest area of District 2. A 60-mile 6-inch feeder line connecting three refineries in Oklahoma with the Great Lakes Pipe Line at Barnsdall, Oklahoma, is also under construction.

The looping of the Texas line between Dallas and Stuart, Oklahoma, has been completed. Other important crude oil pipe line projects now under construction include looping the Stanolind line between Graford, Texas, and Healdton, Oklahoma; increasing the capacity of the Stanolind line from Oklahoma to Chicago; looping the Illinois line between Lima and East Sparta, Ohio; installing additional pumping equipment on the Buckeye line across Ohio; reversing the Tuscarora line across Pennsylvania, and making numerous changes in other lines in New York State and Pennsylvania to increase the flow of crude oil to the East Coast. These changes are designed to deliver an additional 40,000 barrels daily into Chicago of which about 27,000 barrels daily will reach the East Coast.

Of course, the 24-inch line from East Texas to Illinois and to the Atlantic

Coast promises us the greatest measure of relief. This line stands out in our program and has challenged the interest of all pipe line engineers. It is the longest and largest pipe line ever constructed for the purpose of oil transmission.

The construction of such a line was advocated by Secretary Ickes more than 2 years ago. As the national emergency developed in the spring of 1941, complete plans for the building of this line were crystallized. Unfortunately, due to the war demands, the material was not made available when first requested. However, as the need for additional transportation developed, the desirability and feasibility of the line became more firmly established.

Finally, in June of 1942, sufficient steel to build the line from East Texas to Southern Illinois was allocated by the War Production Board. Work was started immediately. Seven contractors undertook the building of this line in eight section spreads. Although many delays, the such as those due to labor troubles, bad weather, and slow delivery of certain materials, have been experienced, progress has been fairly satisfactory. Today, about 400 miles of the 530 miles of pipe have been welded and laid in the ground. It is expected that the pipe laying between Longview and Norris City will be completed by December 10.

Analyses have been made which prove clearly that an extension of this line to the Eastern Seaboard is imperative, not only to supply essential domestic requirements, but to supply the offshore demands of our armed forces. The Office of Petroleum Coordinator made a formal request of the War Production Board for the allocation of materials for this extension on October 6, and supported its application with the filing of a comprehensive report designed to justify this construction. The request of the Coordinator pointed out that in addition to the completion of this line, our office was convinced that it would be necessary eventually in the successful prosecution of the war, to lay another large pipe line from the Southwest to hte Eastern Seaboard.

On October 27, the War Production Board authorized the extension of the 24-inch line to the Eastern Seaboard and allocated the necessary materials for this construction.

The War Production Board's Pipe Line Committee in its study of this problem in consultation with representatives of the Office of Petroleum Coordinator, recognized the probable necessity for a second large line and requested the Coordinator's Office for an additional report showing plans and factual justification therefor. It seems clear that if the war lasts, a second large pipe line to the Eastern Seaboard will have to be provided in 1943. In this case, of course, one of the lines will probably operate as a products carrier while the other will operate as a crude carrier.

The problem of supply for the War Emergency Line at Longview has presented several complications. The General Committees for Districts 1, 2 and 3 have been working for several weeks on this matter. It calls for many pipe line adjustments and reversals. The refining schedules of the Gulf Coast refineries have been affected. It calls for greater use of West Texas oils, as well as oils from the Corpus Christi area of Southwest Texas. In addition to the 8-inch line that is being built by Sinclair Pipe Line Company from Corpus Christi to Damond Mound, it is apparent that a large crude oil carrier from Corpus Christi to the Houston area is warranted. Plans are being developed for conversion of one of the large gas lines to an oil carrier from Corpus Christi to Houston to deliver approximately 75,000 barrels per day.

To augment East Coast supply of necessary winter heating oil, also as an outlet for the war plants of the Gulf Coast, it is now apparent that the War Emergency Pipe Line will operate in the first quarter of next year on something like 125,000 barrels per day of heating oil and 175,000 barrels per day of crude oil. Arrangements are being made by the War Emergency Pipe Line Company to batch these oils for transshipment at Norris City. The Coastal heating oil and some crude oils will be transmitted to Longview by reversals of one 12-inch and three 10-inch pipe lines with a total carrying capacity of approximately 165,000 barrels per day.

The natural question is: What results will be accomplished by all these pipe line projects in terms of deliveries of crude oil and products to the East Coast? Pipe line deliveries prior to the declaration of the national emergency in May 1941 were about 42,000 barrels daily. Changes brought about thus far have increased those deliveries to nearly 135,000 barrels daily.

Upon the completion of projects now under construction, other than the War Emergency Pipe Line, it is estimated that deliveries will be increased to 208,000 barrels daily. This forecast does not include deliveries via the Southeastern line between Port St. Joe, Florida, and Lookout, Georgia. This line is located entirely within District One. It is fed alternately by barge and tankers at the point of origin. However, it assists materially in delivering products to the southeastern states.

The forecast also does not include deliveries which will be made via the Trans-Florida line. This line will be served by barge off the eastern terminus of the Gulf Intracoastal Canal and will deliver products to Jacksonville for distribution by barge along the Atlantic Seaboard.

The use of the War Emergency Pipe Line will provide for the movement of 300,000 barrels daily into the Southern Illinois area. It is estimated that this line will result in a net increase of approximately 120,000 barrels to District One. When the line is extended to the East Coast, it will deliver 300,000 barrels daily into the New York-Philadelphia area. Deliveries over this line to the East Coast, if increased to 450,000 barrels per day, would require the installation of 200 percent additional horsepower.

Based on an estimated essential domestic demand in District One for the period July 1943—June 1944, of 1,250,000 barrels daily, pipe line deliveries, not including the War Emergency Pipe Line, will amount to approximately 16½ percent of total demands. With the War Emergency Pipe Line completed to the East Coast, the percentage would be 40 percent.

The report recently filed with the War Production Board on the extension of the 24-inch line to the Atlantic Seaboard discloses that the extension would save the equivalent of 85 notional tank ships (11,000 DWT—10 knots). This report further shows that the pipe line extension will increase deliveries to certain overseas points with no more steel than would be required for tank ships in comparable delivery. The pipe line, moreover, would effect great savings in power equipment, manpower and money cost.

Closely associated with the function of recommending changes in existing lines and construction of new lines is the task of securing the necessary materials to make those changes and new lines possible. We are familiar with the fact that nearly all material necessary for pipe line construction is on the critical list. Demands, therefore, far exceed supply.

To procure the necessary pipe, pumps, motors, valves, fittings and other accessories incidental to pipe line construction has required the constant attention of the Transportation Division. Every pipe line project calls for the filing of an application with the Office of Petroleum Coordinator. These applications must be thoroughly analyzed and supported by recommendations. The applications are then processed through the Army and Navy Munitions Board and the War Production Board. Practically all the projects referred to have been delayed because priority ratings have

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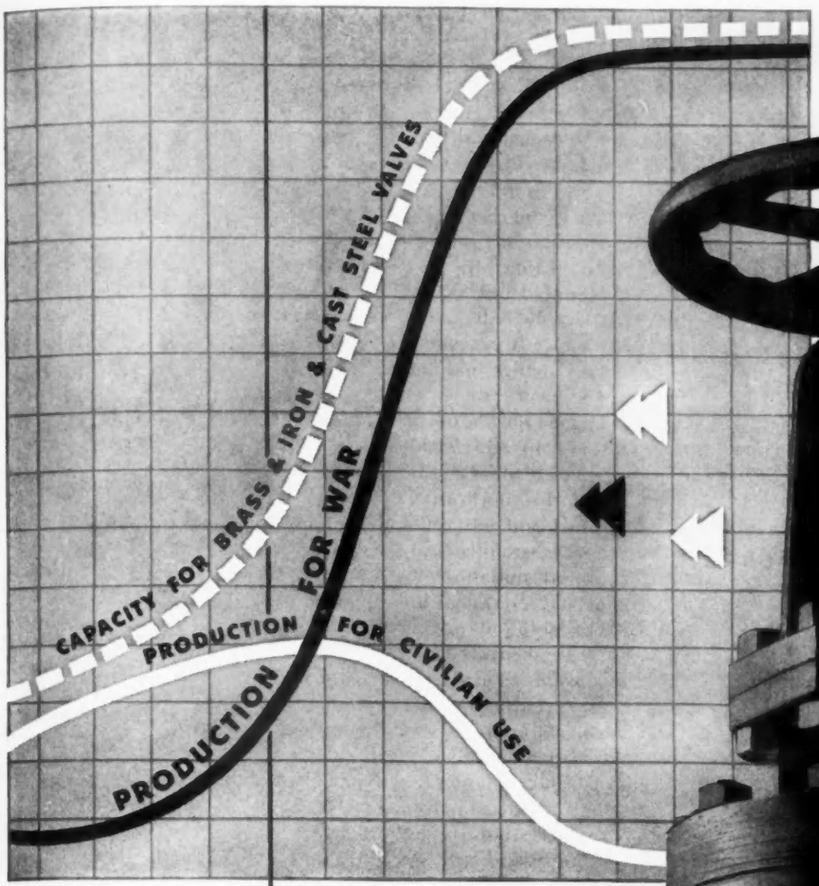

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Pipe Lines as Well as Oil Needed to Enlarge Output

Steps Being Taken to Assure Pipe Line Facilities in Areas That Will Be Called Upon for Increased Crude Oil Production

By L. J. LOGAN, Associate Editor

FROM the standpoint of the producer, the data given herewith point to ultimately larger requirements of crude oil production from fields of Texas, New Mexico, Louisiana and Arkansas. From the standpoint of the pipe-line man it presents a coordination of what has been done in pipe-line activities since OPC was established, as well as speculation as to further activities in pipe-line construction and operation.

WHILE widespread concern has arisen over the ability of United States oil fields to produce on a sustained basis all the oil that will be needed in the next several years, there is need also for considering meanwhile the availability of pipe lines and other transportation facilities for assuring delivery of the oils from the fields to points where required. For as demonstrated forcefully heretofore, producing ability means little if not supplemented by transporting ability.

It is fairly common knowledge in the oil industry that presently available surplus producing ability in the United States is largely in OPC District 3, and furthermore, mostly in a few prolific districts, including particularly the upper and lower sections of the Texas Gulf Coast, West Texas, and New Mexico, and in less importance some other districts of Texas and South Louisiana.

Therefore, it is those areas that need to be examined as to whether or not they have pipe lines sufficient to handle such increased production as they may be called upon for, to take care of any increase in overall demand for petroleum and to compensate for declines in output in slipping districts such as Illinois, Mississippi and Oklahoma.

Such examination indicates that considerable work will be necessary on the existing networks of pipe lines in the oil country of Texas and adjoining states, including some laying of new and relocated lines as well as large scale reversals of present southward flow in Texas lines. Nevertheless, the real bottleneck is not in the oil country but between there and the heavy consuming areas of the East and Middle West. The simple truth is that the basic transportation problem is one of compensating as fully as possible for the virtual elimination of tanker shipping by the substitution of pipe lines from the Southwest to the East.

A great proportion of the nation's need for oil is on the East Coast, and a similar proportion of its available supply is in the Southwest, and in the future an even larger proportion of the supply must come from the Southwest, without tankers for doing the job. This explains why Petroleum Coordinator Ickes, finally having gained approval of a complete large pipe line all the way from Texas to New York, already has advocated construction of a second large line between those points. The coordinator has coordinated his information on the producing ability of known oil fields with information on prospective requirements of petroleum, and has come up with the only answer which is another trunk pipe line from fields with a future to established consuming centers.

In connection with the eventual war need expansion of trunk pipe line capacity from Southwest to East, however, there will be necessary considerable rearrangement of the networks of pipe lines in the supplying areas of the Southwest. The systems are based on two main, long established movements of petroleum: (1) northeastward from Northern Texas, Oklahoma, and Kansas fields to the Middle West and a small quantity on to the East, and (2) southeastward and southward from fields of New Mexico, West Texas, Central Texas, Eastern Texas, North Louisiana, and Arkansas to refining and shipping centers on the Texas Gulf Coast, thence to Atlantic Seaboard.

Fundamentally, today's problem is to divert a part of that movement to the Gulf Coast into a new, third main movement of oils to market: the movement that will be established by the big-inch line, a more southerly flow than the old movement from Oklahoma-Kansas eastward, extending along a fairly direct course from northeastern Texas to New York. Instead of oils going in such large proportions to Corpus Christi, Houston, and Port Arthur-Beaumont, there will have to be increased movement to Northeast Texas and some reversals of southward flow, when fields of West Texas-New Mexico, Southwest Texas, and the Gulf Coast are called upon to feed oils into the contemplated large pipe lines to the East.

If there were no tanker shortage, there would be no transportation problem in connection with making use of the proved crude reserves which will have to tide the nation over in the next several years. Given tankers and certain improvements in pipe line facilities, the fields held in reserve in Texas, New Mexico, and South Louisiana could feed into existing pipe lines and thence by water to ultimate markets at least about 285,000 barrels a day more petroleum than they now are producing, as proved by the fact that last December they actually were producing that amount more than at present. (See accompanying table.)

West Texas alone is now cut back approximately 100,000 barrels from its actual daily average producing-marketing rate of December, New Mexico 20,000 barrels a day, the Texas Panhandle 8000, Southwest Texas 67,000, the East Texas field 42,000, and the Louisiana Gulf Coast 48,000. It so happens that these areas still could produce efficiently as much as they were producing last December, while all but the Panhandle and East Texas could produce substantially even more. Thus a material part of the present problem is simply to

provide these areas as much market outlet under present conditions as they had while tankers moved freely. Such restoration of former volumes of outlet would largely take care of any increases in petroleum requirements and compensate for declines of producing ability of other districts.

Accordingly, readjustments in transportation, now under way and indicated for the future logically are directed in the first place toward building of large pipe line capacity between East Texas and Atlantic Seaboard. Crude will be needed for the lines from throughout eastern Texas and from upper Gulf Coast fields, forcing reversed pumping in lines that formerly delivered East Texas crude to the coast. Such movement of Gulf Coast - Eastern Texas crudes will make room for more West Texas-New Mexico crudes in refineries at Houston, Beaumont and Port Arthur, and also for crudes from the Corpus Christi district, lower Gulf Coast. Meanwhile, some West Texas, Panhandle, and North Texas fields with surplus producing ability will be called upon to make up for declining production of Oklahoma and Illinois.

The currently building half of the 24-inch pipe line to the East (from East Texas to Illinois) will transport about 150,000 barrels of crude and fuel oils daily when put into operation around January 1 and will handle 300,000 barrels daily when all pump stations are finished about March 1; but the line will be merely replacing and improving upon present tank car deliveries from the Southwest to Illinois, releasing the cars from that run for use between Illinois and the East; and the full 300,000-barrel movement to Illinois will afford a net increase of only about 100,000 barrels daily in oil takings from the Southwest and similarly in oil deliveries in the East. Not until the eastern leg of the 24-inch line is completed, from Illinois to the Philadelphia-New York areas, will there be achieved the full net gain of 300,000 barrels daily in deliveries out of the Southwest and into the East; for only then will there be a complete through movement by pipe line and a shifting of tank cars back to their present use.

For supplying the originally needed extra 100,000 barrels daily of crude for the 24-inch line, there will be several sources. There will be a substantially increased draft on the East Texas field, it is indicated. That field currently is producing 42,000 barrels a day less than it was doing last December, and it possibly could be put back on the December rate, in view of measures for reducing salt water output. This statement, however, is subject to controversy. Some crude could be supplied also from Rodessa and other fields of the region where Louisiana, Arkansas, and Texas state borders meet, although Arkansas currently is producing at December rates and North Louisiana 12,000 above December output. In addition, substantial daily volumes will be required from miscellaneous Eastern Texas fields and fields of the Texas Gulf Coast; and in line with that requirement, several Eastern Texas-Gulf Coast pipe lines are being prepared for northward pumping instead of the normal southward movement. There is not any great problem in supplying the 24-inch line initially.

Furthermore, stepping up the supply for the large line to 300,000 barrels daily will not constitute a highly formidable problem, as the task will be greatly facilitated by the existence of approximately a dozen pipe lines from Eastern Texas to refining-shipping centers at Houston, Texas City, Beaumont, and Port Arthur. Fortunately, several of those lines have been equipped heretofore for two-way pumping, aside from the several so equipped lately for the special purpose of feeding into the 24-inch line.

However, in consequence of large-scale reversal of flow in lines between East Texas and the Gulf Coast, it will be necessary to compensate by stepping up receipts on the upper Gulf Coast of oils from West Texas and the lower Gulf Coast. Accordingly, there is arranged already a movement of over 20,000 barrels of crude daily from the Corpus Christi area by pipe line to the Houston area, the Sinclair line that formerly reached only part of the way from Houston having been extended on to the Corpus area fields by combining some existing smaller lines into the system and adding some relocated pipe. In addition, there is talk of another line comparable with or larger than the Sinclair system. Moreover, there is under consideration the conversion of one of the two large paralleling and partially duplicative natural gas systems from the Laredo-Corpus Christi area of Southwest Texas into an oil line, with the idea that it would afford capacity of around 75,000 barrels daily and thus together with the Sinclair line deliver nearly 100,000 barrels of Corpus Christi area crudes daily to the Houston area. While the gas lines are of large diameter, their carrying capacity for oil would be limited by the wall thicknesses of the pipe involved.

These possible pipe line facilities would go a long way toward providing whatever transportation will be needed to take advantage of established crude reserves in the lower Texas Gulf Coast area and Southwest Texas. However, some additional outlet might be needed. As shown in the accompanying table, Southwest Texas (including Corpus Christi, Laredo, and San Antonio areas) currently is producing 67,000 barrels a day less than it was putting out last December, and it probably could produce materially above the December rate, particularly with further development of flush fields and extension of pipe lines to some fields that have never been given pipe line outlets. To take full advantage of the producing ability of the district, substantial pipe line work therefore might be necessary.

Heretofore, on the basis of moving crudes to the Corpus Christi, Houston, and Port Arthur-Beaumont refining-shipping centers, New Mexico and West Texas fields have had ample pipe line outlet, and in fact, capacities of most of the lines were cut down some because of being excessive, by moving pumps, tanks, and limited sections of pipe to other areas where needed. Even so, there is at present a large amount of capacity which is not being currently used, following curtailment of tanker movements. The present slack in the lines is measured approximately by the current curtailment of New Mexico-West Texas crude production below the peak levels of last December, when the lines were fairly well able to handle the output of the wells. As shown in the table, New Mexico currently is pro-

[*Continued on page 58*]

Curtailment of Crude Production Under December Rate in Prolific Areas of Southwest Indicates Substantial Pipe Line Capacity Currently Unused but Usable Upon Rearrangement of Systems

STATE OF DISTRICT	(BARRELS DAILY) Crude Oil Production 4 Weeks Ended Dec. 27, 1941	Crude Oil Production 4 Weeks Ended Oct. 17, 1942	Difference of Current Production from That in Dec., 1941
Oklahoma	414,850	366,200	— 48,650
Kansas	251,200	289,700	+ 38,500
Nebraska	5,400	3,350	— 2,050
Texas—Panhandle Texas	93,400	85,100	— 8,300
North Texas	108,100	139,250	— 200
West Central Texas	31,350		
West Texas	302,900	203,800	— 99,100
East Central Texas	87,350	87,400	+ 50
East Texas Field	387,100	344,850	— 42,250
Southwest Texas	226,050	158,950	— 67,100
Coastal Texas	303,850	305,800	+ 1,950
Total Texas	1,540,100	1,325,150	—214,950
Louisiana—North Louisiana	81,900	98,100	+ 16,200
Coastal Louisiana	277,250	228,900	— 48,350
Total Louisiana	359,150	327,000	— 32,150
Arkansas	73,700	73,350	— 350
Mississippi	73,400	71,350	— 2,050
Illinois	391,150	264,900	—126,250
Indiana	19,750	17,150	— 2,600
Eastern (not incl. Illinois and Indiana)	93,200	96,150	+ 2,950
Michigan	54,850	63,250	+ 8,400
Wyoming	85,500	92,500	+ 7,000
Montana	22,350	21,650	— 700
Colorado	5,300	6,800	+ 1,500
New Mexico	118,200	97,950	— 20,250
TOTAL EAST OF CALIFORNIA	3,508,100	3,116,450	—391,650
California	645,050	721,700	+ 76,650
TOTAL UNITED STATES	4,153,150	3,838,150	—315,000

Natural Gas and Natural Gasoline In the War Effort

By E. HOLLEY POE, Director,
Natural-Gas and Natural-Gasoline Division,
Office of Petroleum Coordinator

Presented before the Division of Production, before the Twenty-third Annual Meeting of the American Petroleum Institute, Chicago, Illinois, November 12, 1942.

WHILE the natural-gas and natural-gasoline phases of the petroleum industry may be relatively small, they are important segments and vital to the war program and to the public welfare. Natural gas does a very big and important job. It touches practically every phase of the war-production program. It is used to keep our fighting men warm, used in preparing their food, and for heating the water to keep them clean and healthy. It is used in hundreds of higher industrial processes all along the war-production stream, and its components provide an important part of fighting fuel.

Release Other Fuels for War

Since 1938 the send-out of natural gas for industrial and commercial purposes has increased by more than 10 percent per year. Indications are that this year will exceed last year by 25 percent, and in some areas as much as 40 percent. Natural-gas consumption in the United States for the year 1942 will probably approach 3 trillion cubic feet. It will exceed that in 1943. For the purpose of comprehension through comparison, it may be stated that 3 trillion cubic feet of 1000 Btu natural gas is approximately equivalent in heat energy to 124 million tons of coal, 879 billion kilowatt-hours of electricity, or 540 million barrels of fuel oil.

I would also call your attention to the fact that this tremendous volume of energy must be consumed largely within the nation, and cannot be exported. Therefore, the greater market served by natural gas in the nation, the more oil there will be available for export to the fighting forces of the United Nations and for usage in markets not at this time served by this superb fuel.

The problems of the natural-gas and natural-gasoline industries are in large measure the same problems that are faced in the production, transportation, refining, distribution, and utilization of oil and its many by-products. As regards natural gas, it differs from oil only in that it is a well-to-burner operation. Therefore, reserves to balance supply with demand must be developed and kept in formation in readiness for a rush call to meet high peak demands. With the exception of a few places where underground storage is maintained, there is no major means of storing natural gas close to the great critical industrial centers in the nation today.

War Problems

The problems resulting from the impact of war include:

1. Increased demands by both war industries and private industries, as well as the normal increase of about 12 percent in normal civilian usage.

2. Lack of materials to expand facilities in keeping with these increasing demands.

3. Increasing shortage of man power brought about by enlistments, induction into the armed forces, and migration of workers to other war industries.

4. Increased expenses resulting from the rising cost of labor, materials, and operating supplies.

5. The heavy tax burden, present and prospective, in the view of expenditure of tremendous sums of money in order to supply demands of the war effort.

6. Ascertaining the expected requirements of natural gas, natural gasoline, and related hydrocarbons by all phases of the war effort in time to provide for them.

7. The need for relief during the war period from express or implied covenants in leases by reason of limited supplies of critical materials which prevent the orderly drilling of wells on such leases.

Appalachian Region

The Appalachian region, which includes such great industrial centers as Pittsburgh, Toledo, Cleveland, Columbus, Akron, Dayton, Charleston, and others, contains about 6 percent of the proved natural-gas reserves of the nation, and the market served equals 18 percent of the nation's natural-gas sales. M-68 was relaxed as respects the drilling of gas wells in this area. As a result of the recent drilling program in this region, it appears that there will be only a few areas within the region where actual shortages will appear on peak-load days during the coming winter. With the drilling of less wells, there has been developed a greater deliverability than during the previous year. In the very near future, however, if the war markets in this region are to be adequately served by natural gas, thus freeing oil for other uses, there is no doubt that there will be need for increased transportation facilities from the great reserves of the Southwest.

District 2

In District 2 are located such large and important industrial centers as Detroit, Chicago, Minneapolis, St. Paul, Omaha, St. Louis, and Kansas City. For the most part, gas to supply these large and important markets is transported through long trunk-line systems originating in the reserve areas of the Texas Panhandle, Oklahoma Panhandle, and southwestern Kansas, or in the fields of Louisiana and Texas. Ability to supply the demand is limited only by the deliverability of existing pipe-line systems.

As respects other markets not attached to these trunk-line systems, the greater part of the gas produced and marketed is being produced from old fields that are now nearing depletion, and from which gas is being taken during peak load at peak deliverability.

The Michigan gas supply is largely an intrastate situation; and, while they have adequate supplies at the present time, their reserves are relatively small when compared with the markets served.

Illinois has practically no marketable gas. Oklahoma is producing almost entirely from highly depleted pools. There are some new pools, such as the Cement area and the deeper sands in the Chickasha area, but the demands on these fields indicate that their depletion will be rather rapid. The old pools of Kansas appear to be from 50 to 80 percent depleted. In this area, and in western Missouri and northeastern Oklaho-

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ma, the provisions of M-68 were relaxed to allow as great a development as possible to take care of the current winter's requirements.

There will be peak-day curtailment in many parts of this district, and the shortage of fuel oil for standby service is becoming acute. Indications are that in this district, within the next 18 months, there will have to be some major pipe-line construction if adequate supplies are to be maintained. In the meantime we are encouraging the exploration of new areas within a reasonable distance of main transmission lines where such lines will be able to transport additional gas to meet the peak loads.

The prospects for new discoveries of any new major gas reserves in this area do not, at this time, appear very encouraging. By reason of this overall condition in District 2, we have had to deal with a situation prevailing in the Hugoton Field located in western Kansas and the Panhandle of Oklahoma. As you all know, this field constitutes about the largest single unified gas reserve in the world, and relatively little gas has been withdrawn from it to date. The occurrence of gas in this field is so uniform and regular that a producing well is almost certain to be encountered in any location in the field. Something over 300 wells have been drilled, and there are about 28 to 30 wells that have been drilled but are not at this time connected to market outlets. The potential gas available from the wells already drilled is more than sufficient to supply the demands of all the pipe lines dependent upon the field for their supply. Notwithstanding this, drilling operations continued in the field. The recent supplement to Conservation Order M-68 has curtailed all further drilling operations in this field without the approval of the Office of Petroleum Coordinator for War.

It is the consensus of opinion that, in order to conserve critical materials as well as the gas reserves of the field, a proper proration program must be put into effect. The Natural-Gas and Natural-Gasoline Division has sponsored joint action by the state regulatory commissions of the states of Oklahoma and Kansas, looking toward a solution to this problem. These agencies are approaching an agreement on the form of a uniform proration order to be issued individually by them for the portions of the field in their respective states. The administration of the orders will be by the cooperative action of the two commissions, and will have the effect of regulating operations in the field as a single unit. This will permit efficiency in the conservation of both critical materials and gas reserves, and will result in making use of most of the gas wells already in existence but not yet connected to markets.

As far as practicable, in encouraging such orders, we recognize that any attempted proration should be predicated on the most direct and least complicated approach, giving reasonable recognition to the correlative rights of the owners of reserves in place and least interference to the withdrawal of gas in keeping with varying seasonal needs.

Large Fuel Reserve—District 3

South of latitude 39, west of the Mississippi River, north of the Gulf of Mexico and Rio Grande River lies the nation's greatest fuel reserve. In the case of natural-gas reserves, it contains the equivalent of something over 70 percent of the total. In the case of production of natural gasoline and related hydrocarbons, the percentage would be greater. It is one of the most important training areas for our armed forces in the country. It is likewise an area in which there is tremendous war-industry activity. It is the region to which we must all look for the greatest source of supply for oil, natural gas and natural gasoline, and related hydrocarbons, because new discoveries of production in this area are generally more prolific than in other areas of the nation. It is the area in which the greatest encouragement for new exploration and development should prevail.

In this area there are large reserves of distillate and large concentrated gasoline-plant capacity producing the largest available supply of natural gasoline and related hydrocarbons which are so critical to the war needs.

The plants of this industry perform a great service in normal times in conserving what would largely be waste products of great value, and in this war period this service can become vital as they make up the deficiency of hydrocarbons at the plants of those refiners who are turning out necessary war materials.

District 4

District 4, comprising the Rocky Mountain states, is the least densely populated of any of the districts. It supports many industries vital to the war program. Large volumes of natural gas are used in the smelting and refining of non-ferrous metals, the production and refining of oil, and the refining of beet sugar. Many new military establishments are also dependent upon gas for fuel. Except for gas from the Panhandle Field of Texas, transported for utilization in Colorado, the area is largely self-sustaining from the standpoint of natural-gas supply.

District 5

District 5, the Pacific coastal area, being separated as it is from the remainder of the country by the Rocky Mountains, is entirely dependent on gas produced within the immediate environs. California, the only large producer of natural gas in the district, has the largest number of gas consumers of any state in the union, and is the only large producer of natural gas that does not export or import any of this natural fuel. Because California's natural-gas production is predominantly casinghead gas, increased demands and scarcity of critical materials have resulted in unusual problems.

In order to conserve gas produced in association with oil in excess of summer demands and utilize it to meet peak demands during winter months, there was needed an adequate storage. As a result of cooperative study of the California Railroad Commission, local oil and gas operators, and the Office of Petroleum Coordinator, it was determined that the partly depleted Playa del Rey oil pool had characteristics suitable to use for gas storage.

Upon recommendation of the Office of Petroleum Coordinator, the Playa del Rey reservoir, located close to the center of the gas distribution system of the Los Angeles Basin area, has been taken over by the Defense Plant Corporation, and will be operated as a gas-storage reservoir to be used primarily as a source of supply to meet emergency peak-load conditions. Geological studies of the structure indicate that the capacity of the field will be approximately 3 billion cubic feet. Of this, 1 billion cubic feet will be allowed to remain in the formation as a pressure backlog, and 2 billion cubic feet will be available for current storage. Three miles of 12-inch pipe has been laid from the Southern California Gas Company's 26-inch main line. This line has already been connected to the injection wells, and gas is being injected in small amounts at line pressure of approximately 160 pounds, pending the installation of a compressor plant.

Among the major developments of District 5 during the past year are:

1. The conversion of the Stanpac line from a gas line to an oil pipe line, and the subsequent rearrangement and addition of natural-gas facilities to handle additional gas from the Rio Vista gas field to the San Francisco area.

2. The general increase in crude-oil production, and particularly the shifting to more low-gravity crude at low gas-oil ratios to get greater fuel-oil yields. This program necessitated some changes in gasoline-plant facilities and gas-handling facilities.

3. The increased demand for *iso*-butane was met by full cooperation of gasoline-plant operators in increasing their plant efficiencies and providing

facilities for maximum recovery of *iso*butane. Our last report indicates about 97 percent of *iso*butane is being delivered to manufacturers of 100-octane.

4. To conserve all gas production, a gas conservation committee, under the direction of the production committee, and assisted by the natural-gas and natural-gasoline committee, has produced most excellent results. The investigation made every operator conscious of the problem and, by voluntary cooperation, practically all of the existing situations have been or will shortly be corrected.

5. Through the cooperation of the production committee, with the natural-gas and natural-gasoline committee, the production of natural gas is being regulated to meet the gas demands. The fact that only two fuels are generally available in California, viz., fuel oil and natural gas, presents an immediate problem due to the need for accumulating maximum stocks of fuel oil for war purposes. This requires that the maximum fuel need of industry in the district be met with natural gas, and requires the maximum production of casinghead gas to meet the requirements in southern California.

Conservation for War

Conservation is the biggest word in the supply phase of the war effort. Likewise, when we talk about the conservation of oil and gas, we are talking about the life span of the oil and gas industry. When we deal with it, we are dealing with the industrial future of the nation, and with the health, comfort, and future of our citizens.

Conservation of natural-gas reserves, and conservation in the production, transmission, and utilization of natural gas, must be faced positively by all of us. Sound policies must be encouraged, and sound laws and their proper enforcement be sincerely advocated. The importance of proper utilization of gas produced with oil calls for continued support of studies designed to permit the proper use, in an orderly manner, of the gas produced with oil, which heretofore has been blown into the air and wasted.

The war emergency will cause many dislocations in our operations, but, on the credit side, dire necessity will teach us much about better production methods, better transportation and distribution methods.

This war is the first thing before the house. Victory in it will strain our resources, require our best talents, and utilize the maximum of our energies. Its prosecution requires the utmost conservation of critical materials which, in our industry, means largely metals and particularly steel. This being true, I should like to emphasize that, in our considerations in the Natural-Gas and Natural-Gasoline Division, we are proceeding on the theory that the most effective promotion of the war program demands the minimum expenditure of critical materials consistent with proper and adequate development of gas reserves and resources required—and only as required—for such program.

Considered Recommendations

Our recommendations will be made after cautious study, with a view to determining whether or not additional gas is needed for the immediate future, or on an overall development program designed to drill a specific number of wells necessary to meet required deliverability. We feel that this policy may be expected to contribute to the most effective promotion of the war program.

We are not approaching our job as a dubious experiment, but with a sincere effort to grasp the facts intelligently, analyze them, and take speedy and objective action on them.

The great petroleum industry is one of the most important segments in the whole war effort. We are interdependent in meeting the emergencies of the hour, the day, and the indefinite period of a very serious war effort. The overall problems before all of us, more and more, will require prompt and thorough consultation, reasoned and competent analysis, and intelligent planning. I think this has been rather well effected already. Shall we mutually pledge continued cooperation?

Outlook

[*Continued from page 18*]

crude oil in connection with the extension of gasoline rationing, there will occur a far reaching readjustment of sources of crude supply when the 24-inch pipe line from northeast Texas to Illinois goes into operation around January 1, taking about 150,000 barrels of crude initially, and thereafter when its capacity is stepped up, by adding pump stations, to 300,000 barrels daily around March 1. These figures do not represent net gains to be provided in markets for crudes from Eastern Texas and other districts, and only about 100,000 barrels daily finally will be added to East Coast receipts. The line merely will make it unnecessary for tank cars to travel so far westward for oils, and it will be to a considerable extent only replacing present tank car shipments to Illinois from Arkansas, Louisiana, and Texas, although also providing some additional capacity between those areas. With their round trips materially reduced in going only from Illinois to the Atlantic seaboard, the tank cars presently used will be able to deliver between those areas the increased volume of oils reaching Illinois in the new pipe line. But as previously indicated, the net gain in Eastern receipts will be in the form of a stepping up of tank car deliveries above their current level by about 100,000 barrels daily, when the full 300,000-barrel daily movement by the new pipe line into Illinois is achieved, in place of present lower movement by tank cars. The entire net gain of 300,000 barrels daily in Eastern receipts and Southwestern deliveries will not be attained until the now authorized leg of the 24-inch line from Illinois on to the Philadelphia and New York areas is completed. At that time tank cars can revert to former use, resuming longer hauls from out of the West and fewer arrivals at Eastern destinations, with a resultant drop in deliveries of oils, which will be more than compensated, however, by inauguration of the Eastern receipts direct by pipe line. While the tank cars then will serve as before the 24-inch line was started, the East will be receiving in addition the full 300,000 barrels daily of through movement by pipe line, and the oil fields of the Southwest will have that much more market. Similarly, if and when the recommended second pipe line along the same route is built, in anticipation of continued declines in producing ability of Illinois, Oklahoma, and other, intermediate areas, then the oil fields of Arkansas, Louisiana, Texas, and New Mexico will be called upon for another 300,000 barrels daily of production.

The longer-term outlook for crude oil demand in the Southwest depends primarily, therefore, not upon the effect of so important a measure as the coming drastic rationing of gasoline but upon the development of increased pipe line facilities between the Southwest and the heavy consuming regions of the Middle West and the East. Ultimately, the latter regions and the producing districts themselves almost certainly will need all the petroleum that can be produced under the war-required restrictions on exploration and drilling.

At first, the limited new market opened up by the 24-inch pipe line will affect primarily the fields in the tri-state area of Arkansas, Louisiana, and Texas, where the line begins. But even then, there will be created indirectly a stronger demand for oils farther south and west. And when the full effect of the 24-inch line and of a possible second line of similar size is exerted, there will be heavy demand for crudes from all fields of New Mexico, West Texas, Southwest Texas, the lower Gulf Coast, the upper Gulf Coast, and other districts which can supply such demand.

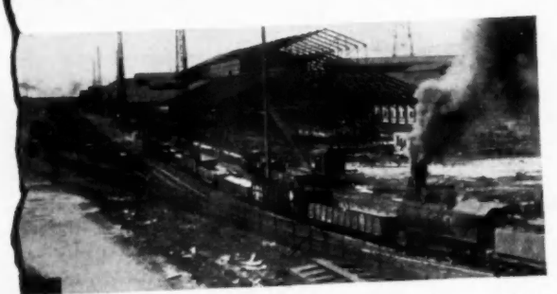
NEWS from the Scrap Front

TIPS FROM OTHER "WASTE WARDENS" THAT MAY HELP YOU DO A BETTER JOB OF "GETTING IN THE SCRAP"

Courtesy Shell News

COUNTER BALANCE WEIGHTS SALVAGED—For years it's been common oil field practice to weight counter balances with old iron. One company declared this a waste of precious scrap, and is substituting stones in its counter balance boxes. This one source of scrap is expected to yield 300 tons! . . . *Are you urging your field employees to report scrap "finds" and to pick up smaller pieces on their regular rounds?*

OLD SUCKER RODS REPLACE NEW STEEL—Besides turning in about 1000 tons of scrap every month for conversion, an important oil company is saving steel by salvaging used materials for other purposes. For example, these junked sucker and pull rods are being used as reinforcing rods in concrete installations. . . . *Does your salvage program include the reclaiming or re-use of old equipment to obviate the need for new wartime purchases?*



WE "PRACTICE WHAT WE PREACH" — In one of many salvage operations, a U. S. Steel subsidiary recently dismantled several of its own mill buildings no longer suited to present steel-making practices. The yield was 3500 tons of structural scrap. . . . *Do you have any steel structures or equipment, idle now and of doubtful future value, which should be scrapped?*

THE SCRAP IS COMING IN . . . BUT NOT FAST ENOUGH!

WE have proof that industry is co-operating in the drive for scrap metals . . . proof measured in thousands of tons. But mills must get *more* iron and steel scrap if they are to meet the gigantic needs of war production.

Don't forget . . . steel gets to work on the battlefront more quickly when plenty of scrap is available. Scrap is already metallic. Therefore, less ore needs to be converted into pig iron per ton of steel produced. By re-melting scrap to make new steel, more tons of high-quality products can be turned out in a hurry for war purposes.

So make it your personal war assignment to see that your organization does a thorough, continuous job of "getting in the scrap." Cooperate with your local Industrial Salvage Committee.

SOME SCRAP ISN'T SCRAP

In the salvage yard of this western oil company old manifolds, headers and other fabricated pipe combinations are cut apart and brought to charging box size. This scrap material often contains short lengths of usable pipe and serviceable fittings, which are segregated and re-used. . . . *Can you cut up your heavy scrap to charging box size economically? It will bring a better price, and facilitate re-claiming usable material.*

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York* · CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago* · COLUMBIA STEEL COMPANY, *San Francisco* · NATIONAL TUBE COMPANY, *Pittsburgh* · TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

UNITED STATES STEEL

Call Up the Reserves

By WILLIAM B. HEROY
Director of Reserves, Office of Petroleum Coordinator

IN THESE days of military operations on a vast scale our thinking has become conformed to terms of strategy and tactics. We eagerly search the papers for news of developments on the fighting fronts and of the success of our forces who are carrying the battle to the enemy. Our confidence in the ultimate outcome rests not only on the bravery and effectiveness of the men who are in action but also on our ability to keep these forces supplied with the ammunition and equipment they neeed to carry on the conflict.

Behind those men at the front are other forces, not yet in action. These are the reserves that are held back by the commander either to support hard-pressed units or to act as a striking force at a well-chosen moment. Such reserves, adequate in numbers and dependable in quality, may tip the scales of victory.

Between the military front and the industrial front, where our lines are drawn, there is a certain parallelism. The first lines are held by the distributors and behind them are the processors and the producers. But a well-organized industrial system requires that, behind these positions, there shall be reserves of raw materials which may be called up when needed to meet unforeseeable demands. An industry functioning with a competent general staff will see to it that its reserves of raw materials are, like those of the armed forces, adequate in numbers and dependable in quality.

The petroleum industry, unlike many other industries, is chiefly dependent upon invisible reserves. Stocks of crude petroleum in storage above-ground, now about 250 million barrels, are less than 20 percent of the annual production. By far the larger part of the crude oil reserves are in underground storage, the amount of which is about 80 times as great as that in above-ground visible storage. Contrast this position with that of the lumber industry, which has all of its inventories in visible form, and has reserves of commercial standing timber which total about 35 times the annual cut.

Requirements

The adequacy of any reserve is determined not alone by the volume of the reserve itself but by the **requirements** that it may be called upon to meet. In the period preceding the present war petroleum reserves aggregating fifteen times the annual rate of consumption were considered adequate to meet all anticipated requirements. The cost to the industry of carrying such reserves was large and increasing and there was considerable question if the industry was economically justified in shouldering so large an annual expenditure. But with the transition to war conditions new requirements not previously contemplated have become realities and the fortunes of war may impose on this industry still further burdens. I need not pursue this topic further to show that reserves which were adequate to the needs of three years ago no longer meet that standard. This factor of safety has been lowered by changing events.

Presented to the Division of Production, before the Twenty-third Annual Meeting of the American Petroleum Institute, Chicago, Ill., November 12, 1942.

Distribution

Another factor which affects the adequacy of our petroleum reserves is their **distribution.** It is obvious that reserves that are near to centers of requirement are much more important than those that are in more remote areas or that are lacking in transportation facilities. The demands for oil in some areas are entirely disproportionate to the proven and developed reserves within their limits.

The Eastern area, comprising District 1, has, in the states of New York, Pennsylvania and West Virginia, less than 2 percent of the total reserve of the nation but its crude requirements amount to nearly 15 percent. The Middle West (District 2) has about 12 percent of the reserves, of which about 9 percent lie west of the Mississippi in Kansas and Oklahoma, while only 3 percent is east of the river in Illinois, Indiana, Ohio, Michigan and Kentucky. Crude requirements in this district are almost 24 percent, substantially exceeding those of the East Coast. The Rocky Mountain region (District 4) has about 2 percent of the proven reserves and is nearly in balance with a demand of about 3 percent. California (District 5) has reserves amounting to about 17 percent of the total with requirements that are increasing and will exceed 20 percent of the total demand during the coming year. Only in the Southwest (District 4) may the reserve position be considered adequate. About 68 percent of the reserves lie in this area with Texas alone accounting for 55 percent. Thirty-seven percent of the demand falls on this area, chiefly in the Gulf Coast of Louisiana and Texas.

The most critical area of unbalance is that which includes the Northeastern states and the Middle Western states east of the Mississippi. In this area, with over 30 percent of the national crude requirements, there are only 5 percent of the reserves. This Northeastern area and California are in greatest need for increased reserves. In other areas, such as West Texas, New Mexico and Wyoming, which are undersupplied with transportation outlets, the immediate necessity for increasing reserves is not so pressing.

A still greater degree of unbalance is revealed when petroleum reserves are contrasted with current production. The states in District 2, with 12 percent of the reserves, are producing over 27 percent, while District 3, with about 68 percent of the reserves, is yielding about 48 percent of the total production. The reserves of California are nearly in balance with the current rate of production but the demand for heavy crude for fuel is rapidly increasing and constitutes a severe drain on the reserve of heavy crude which comprises about 28 percent of the total reserves of the state.

Availability

A third factor which is of prime importance in relation to petroleum re-

serves is **productive capacity.** The ability of any field to produce oil is dependent upon the extent to which it has been developed and on the amount of oil that may be obtained from the wells already drilled. The reserves, proven and prospective, of a field may be large but its immediate output may be limited by lack of development. Obviously reserves that are now developed and can be relied upon to produce when needed are of greater importance in the war program than those of fields which require extensive development to make their reserves available. The scarcity of materials and manpower, under war conditions, will handicap the present development of such fields, other factors being equal.

In the early stages of the development of a normal field, while the reservoir pressure is high, it is possible to produce the wells at high rates. This youthful period of its life is that of "flush production." The rate at which actual production will take place during that period depends upon such factors as the policies of the state in which the field is situated, the action of state regulatory authorities, the wishes of the operators, and the available outlets for the crude. If the reservoir energy is conserved by prudent operation the period of flush production may be substantially prolonged. Sooner or later, however, the period of maximum productive capacity will be reached and passed and the field will enter the stage of decline which we call the period of "settled production." Depending upon the manner in which the field is operated the transition may be gradual or very brief. Where fields are operated at maximum capacity the flowing life of the wells may be only a few weeks and they may reach their maximum production within a very few months. Such has been the case in many fields here in the State of Illinois where we are meeting today.

The period of settled production will ordinarily be much longer than the period of flush production. It continues until the return from the oil produced becomes uneconomic and the well is ready for abandonment. Toward the end of the period of settled production the field may become economically marginal and the wells will be operated as "strippers." These stages of settled and stripper production, of maturity and old age, may last for many years. Finally some fields may be rejuvenated for a time by methods of secondary recovery and may produce a second crop of oil of substantial importance to the industry.

The point which I wish to reach through this rather abstract discussion is that, at any time in recent years, the great majority of our producing oil fields were in or beyond the stage of settled production, while comparatively few fields are in the flush stage. Fortunately for our oil economy the period of flush production of a field is also one of large production. A check of the 75 fields having the largest total production in 1941 shows that 48 of these produced more oil in that year than in 1940. When the magnitude of flush production is measured by the performance of individual wells we find that out of about 400,000 producing oil wells in the United States only about 12 percent are flowing wells. I wish that I could present figures showing how much of our annual production comes from flowing wells but they have not been collected. A fair estimate would be that from a fourth to a third of the total production comes from flowing wells with the rest obtained by artificial lift.

The production of the wells that are on artificial lift cannot be materially increased above present levels. Any increased demand for oil must therefore be met by the opening up of flowing wells and by additional liftings from a comparatively small number of wells that are not being pumped to capacity. The fields where such increased production can be obtained are limited in number. With all of our immense underground reserves there are very few fields where production can be sustained for long periods at greater rates than those at which the fields are now being operated.

To throw some light on this point I have selected the 75 fields having the largest total production in the year 1936 and have traced their more recent production history. During the succeeding years these fields have in many cases been extended to embrace new areas and to take in deeper sands. Thus, there is undoubtedly in the figures some increment which may distort the comparison. However, these same fields produced in 1938 107 percent of their 1936 production; in 1939, 81 percent, and in 1941, 75 percent.

When all these elements are considered—the large amount of settled production that cannot be expanded, the normal declines of older fields and the limited amount of inoperative productive capacity in flush fields—how can we expect to maintain production at the present rate through a period of demand that may remain at present levels for several years or that may have to be increased to meet requirements that cannot now be predicted? We all know the answer—new fields must be continuously discovered and developed to offset such normal decline; new productive capacity sufficient to meet such present and future demands as they may arise must be created; the underground reserves must be raised to a level commensurate with such anticipated demands; and the effort of new discovery and development must be largely concentrated in the areas of greatest need.

Let us see if these generalizations cannot be expressed in more specific terms.

To find out how much additional production must be supplied, it is necessary to construct a composite decline curve of all present production, which has been done by Ralph Schilthuis, OPC assistant director of production. It indicates that, if no production derived from new discoveries or developments is included, and using 1941 production as a basis, production in 1942 will be 106 percent, in 1943 90 percent, in 1944 81 percent, in 1945 69 percent, and so on. All this oil would be drawn from presently existing underground reserves. Schilthuis' estimate was made early this year; actual figures thus far available show that production is running only about one percent above last year. Nevertheless, this composite decline curve is the best guide we have as to future performance. Assuming a current production of 4,000,000 barrels per day, there must be made available from new discoveries and development in 1943 about 400,000 barrels per day; in 1944 about 800,000 barrels; in 1945 about 1,200,000 barrels; and in 1946 1,600,000 barrels per day. Expressed in other terms, it means that on the sloping roof of the annual decline curve, new annual shingles must be lapped, equivalent to 400,000 barrels per day of new production. This is a measure of the task of exploration and development that faces the oil industry in this period of crisis. Four hundred thousand barrels per day is more than the current production of the East Texas field; about the combined average daily production in 1941 of the next six largest fields in the country.

Discovery Rates

There is another basis for appraising the magnitude of the required discovery effort. It has been frequently stated that our underground inventory should be replenished by new discoveries in an amount certainly not less than the amount of oil brought to the surface each year. This averaged about 1,400,000,000 barrels over the last three years. In 1937 and 1938, the two latest years in which we discovered more oil than we produced, the reserves of the new fields found average about 12,000,000 barrels each. If we were to set for ourselves the goal of equalling the per-

formance of those years, we should discover each year about 150 fields of that magnitude. If we were only to replace current production the goal would be about 125 fields of that size per year.

Unfortunately we cannot be even that sanguine, for the discovery record of the years since 1938 is not a happy one. New fields have been found in greater numbers, if it is true, but there has been a marked drop in size—the reserves are averaging less than half of what they did before. Granting that preliminary estimates of the reserves of recently discovered fields may not do them justice, and that it takes two or three years to appraise them fully, it still seems quite certain that over the last three years withdrawals have been substantially greater in volume than new discoveries. Even the most optimistic analysts do not suggest that the underground inventory has been increased over the recent period.

But what about the exploratory effort that it took to make the discoveries of the past few years? The total number of wildcats drilled increased from 2224 in 1937 to 3264 last year. This year the number may not exceed 3100. During the first half of this year one wildcat in eight was an oil well, so that the discovery rate has not apparently fallen off. It is too early to judge the merits of most recent discoveries but only a few fields have been found in 1942 that give promise of reaching the 10 million barrel class. It would seem at this time that we are far short of an annual goal of 125 or 150 such fields.

When we look at the record of wells drilled in producing fields the record is equally disturbing. Only 60 percent as many wells have been drilled this year to date as in the corresponding period last year. Even assuming that the productive capacity of these wells is (because of wider spacing) somewhat greater, it still appears improbable that new productive capacity is being added at a rate adequate to sustain present production. The fact that the number of production wells drilled this year is according to plan and is determined by the drilling materials that are available does not alter the result.

In placing before you this picture of the present situation as regards discovery and development, I have sought to be realistic and to look the facts squarely in the face. If this picture is a faithful one, then the industry is confronted with a problem of increasing gravity. It is a problem that, however difficult, must be brought to a successful solution, for it cannot be said of oil men that they failed the country in its hour of greatest peril. We ask each other, "What can we do, within the limits imposed by a war economy, that we are not now doing to cope with the situation?"

Recommendations

Perhaps I may, without undue assertiveness, suggest four general lines which, if followed, may lead toward the goal.

1. **Make the most of our man power.** The requirements of the armed forces have made heavy inroads on the personnel of the industry engaged in oil finding. Many companies have lost from a quarter to a half of their engineers, geologists and geophysicists. Drilling contractors have had similar losses from their crews. Men who have obtained their skills in these occupations through years of training and experience cannot be easily replaced. Substitutes cannot be developed in a few months or, in some cases, in a few years. As Arch Rowan recently remarked, "You can't drill wildcats with women and old men."

What can be done about it? Not nearly enough to prevent the serious handicapping of such work. But every effort can be made to use the remaining man power more effectively. Technical men can often be relieved of executive and administrative responsibilities and routine and allowed to concentrate on exploratory problems. The preparation of extended reports, desirable as a record in normal times, can be largely dispensed with and short statements of conclusions relied upon. It should be recognized that it takes ten wildcats, on the average, to find an oil field, and a geologist who chalks up a few dry holes should not be subjected to undue criticism from his management.

2. **Make the most of our materials.** The oil industry has become accustomed to having available the best of materials and equipment that engineers can design. Standards of equipment for drilling equipping wells, as set by regulatory bodies and by the operators, have been high. We are now faced with serious shortages of many materials that have come to be regarded as essential, and, if the established priorities are followed, this inevitably means the drilling and completion of fewer wells. It is, therefore, essential that the highest skill in the field of development available to the industry should review present standards with a view to obtaining the most economical use of available materials. Fortunately, the amount of critical materials required for drilling wildcat wells is much lower than for completing producing wells—dry wildcats take little steel. Even this amount can in many cases be reduced by the use of nonferrous pipe for surface casing. An important opportunity exists for the use of non-ferrous pipe in shallow wells for the disposal of salt water. It has recently been suggested that in some districts wells can be completed without setting an oil string, by the use of tubing only. Other similar short cuts can doubtless be devised and put into practice.

3. **Make the most of our information.** Over the years the oil industry as a whole has collected an immense amount of information concerning petroleum geology. Most of that information has never been made public but has been quite properly held by the operators who obtained it as a trade asset. Data which were significant as to the presence of oil and gas in various areas but which was not sufficient to justify wildcatting have, in many cases, been filed away and, with changing personnel, often forgotten. Prospects of some promise that could not be followed up because of difficulties with land ownership or for other similar reasons have become dormant. These are deserving of review and rechecking under present conditions. There has always been a commendable degree of liberality in the industry in exchanging information and this policy can well be extended and broadened for the national interest at the present time.

4. **Make more funds available for exploration.** An industry-wide program of exploration and development adequate to present needs cannot be carried out without material increase of expenditures over the budgets of earlier years. If more geological and geophysical work is needed, if more wildcats must be drilled, and all at higher unit costs, more money must be provided.

In normal times much of the cost of wildcatting has been defrayed by venture money, in large part derived from sources outside the industry. Under present conditions this source is likely to be dried up. The financial support of exploration will correspondingly become the obligation in increasing measure of producing companies and of the large integrated units of the industry.

I recently heard a story about an agricultural agent of the government and a farmer. The agent came down the road and stopped by the fence of the field where the farmer was plowing, called him over to the fence and told him that the government had just gotten out a new book which contained the most up-to-date information about farming in all its branches and he was selling copies for a quarter. He was sure the farmer would want a copy. But the farmer showed no haste to buy and finally said, "No, I don't think I want one. You know I don't farm now half as good as I know how."

Let me, in conclusion, simply leave the thought that, if our great industry devotes to this problem of exploration its best efforts, it surely will not fail.

Here's *Exactly* Why

The CONCAVE SIDE

Saves Belts-Saves Rubber-Saves Power!

Pick up any V-belt that has straight sides. Bend that V-belt while you grip its side-walls as in the picture above. You will feel the sides of the belt bulge out —as shown in Figure 1 on the right. Clearly, that out-bulge gives the belt a shape that does not fit its sheave groove.

Now look at Figure 2. There you see what happens when you bend a belt that is built with the patented Concave sides. You get a similar change in side-wall shape—but what a different result! The precisely engineered Concave side becomes perfectly straight. There is no out-bulge:—the full side-width of the belt *uniformly* grips the sheave groove wall. This means *uniform* wear—*longer* life—a saving in belts for you, a saving in rubber for the Nation. In addition, this full side-width grip on the pulley carries heavier loads without slippage—another saving of belts and a saving in power too!

Only belts built by Gates are built with the Concave side, a Gates patent.

What Happens When a V-Belt Bends

FIG. 1

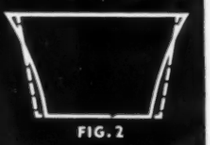


FIG. 2

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

Chicago, Ill.
549 West Washington

New York City
215-219 Fourth Avenue

Birmingham, Ala.
405 Liberty National Life Bldg.

Los Angeles, Cal.
2240 East Washington Blvd.

Denver, Colo.
999 South Broadway

Dallas, Tex.
2213 Griffin Street

Portland, Ore.
333 N. W. 5th Avenue

San Francisco, Cal.
2700 16th Street

Serious East Coast Shortage Foreseen by War Council

DAILY shortage of 100,000 barrels of petroleum products for the Atlantic Seaboard area over the next five months is anticipated by the Economics Committee of the Petroleum Industry War Council. So serious is the outlook, prompt reduction of Eastern gasoline allowances was suggested, along with other recommendations. This prospect was outlined by Dr. Robert E. Wilson, committee chairman, at the council meeting in Chicago last week.

The council, at the same meeting, adopted a strongly worded resolution opposing subsidies from government agencies to encourage oil field development. Reasons set forth were that no such plan could accomplish the desired objective, that administrative problems would be unsurmountable, that it would encourage unsound projects, and that it would jeopardize the American system of free enterprise. The same resolution called for a fair and adequate price for crude oil as a better means of providing for reserves.

Another resolution adopted by council members asked for a speed for trucks in excess of the 35 mile an hour limit fixed by the Office of Defense Transportation. It stated this was necessary to provide essential hauling capacity for the nation.

Failure of tank car deliveries to reach the total hoped for in some circles as well as consumption of gasoline at rates higher than anticipated were given as reasons for the East Coast shortage. The report brought out the possibility that increased military activity may further influence shortages in the area. No relief is in prospect, it said, until the 24-inch pipe line is completed.

The report also emphasized the refining problems created by cutting passenger car gasoline consumption to 50 percent of normal and overall gasoline consumption to 75 percent of normal, while heavy demands for fuel oil still persist. The drastic readjustments in refinery yields required to bring this about necessitate the prompt adoption of some plan for compensating refiners for producing less of their high-priced products and more of their lower-priced products, the report asserted.

A summary view of the Eastern Seaboard outlook as compiled by the economic committee is presented in an accompanying tabulation. The deficits indicated of approximately 50,000 barrels daily, or some 7 million barrels over the winter period, were calculated on the basis of supplying only rationed demands as measured by existing rationing orders. On the assumption that the rationed requirements of fuel oil must be supplied, the shortage, if applied solely against gasoline, would require such a reduction in gasoline stocks as to be obviously unattainable. Thus the shortage must be made up by either (a) a further reduction in the gasoline ration, or (b) the provision of additional tanker transportation. As additional tankers appear unlikely, the shortage indicated would be increased to over 100,000 barrels daily if tank car movements cannot be raised over recent delivery of around 750,000 barrels daily. Significantly, shipments by tank car, which gradually increased from 100,000 barrels per day in January to 830,000 barrels daily in September, with practically no interruption in their continuous rise, of late have had an erratic and somewhat downward trend. This would indicate it is unsafe to count upon daily deliveries materially in excess of 800,000 barrels, or thereabouts, over the cold months.

Furthermore, the excess rates at which tank cars have been operated during the past few months makes it logical to anticipate more cars out of service for repairs.

The estimated deficiencies and overages of supplies shown, the economic committee warned, are subject to modification to the extent that unforeseen military demands, either on supplies or transportation, may have to be met. Naturally, larger consumption by military forces are anticipated.

Besides the East Coast shortage, another serious problem facing the oil industry is the necessity of making major readjustments in refinery product yields. Imposition of nationwide rationing of gasoline on November 22 brings to a sharp focus the impending radical decline in total motor gasoline consumption. The reduction expected is calculated to be of the order of 13 percent as compared with recent demand, which already has reflected the effect of voluntary conservation, and this reduction will be super-imposed upon a situation in which demands for other products are pressing upward. This situation, obviously, calls for a pattern of refinery output entirely different from that heretofore prevailing. The only possible way, the report declared, in which to meet this situation is through adjustment of refinery yields so that each refinery area will be turning out substantially less gasoline and materially more fuel oil.

Adjustments in yields are considered necessary to achieve a balance between supply and demand. If yields indicated for the future period are not attained, the committee predicted an overproduction of gasoline and an underproduction of fuel oils; and, as the gasoline accumulates in storage, the necessity for reducing runs would be aggravated, and the shortage of fuel oils would be ac-

Summarized Table Showing Forecast of Supply and Demand for District I

(1000s of Barrels Daily)

	November	December	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
SUPPLY							
From Outside							
Tank Car	811	840	867	960	860	810	871
Pipe Line	155	159	191	197	457	490	334
Barge and Lake Tanker	108	110	114	180	195	159	162
Deep Sea Tanker	100	100	75	25	25	25	37
Local Production	85	85	85	85	85	85	85
Total Supply	1,259	1,294	1,332	1,447	1,612	1,569	1,489
DISTRICT I DEMAND							
(Local and Export)							
Gasoline*	467	465	465	484	489	491	482
Kerosene*	140	178	147	75	73	145	110
Distillates*	273	337	312	133	107	245	200
Fuel Oil*	340	372	373	313	294	337	329
Other	130	130	126	139	143	143	138
To Other Districts	20	19	19	19	19	19	19
Total Demand	1,370	1,501	1,442	1,163	1,125	1,380	1,278
Change in Stocks	—111	—207	—110	+60	+92	+26	+16
Average Daily Shortage versus desirable minimum stock levels of 52,000,000 barrels as of March 31, 1943	50,000	50,000	50,000	None	None	None	
Surplus for additional export versus minimum desired stock levels	None	None	None	224	395	163	195

* Local demand rationed.

centuated. Finally, and as a consequence of lack of earlier action, the yields would have to be adjusted even more radically than at present. To avoid this uneconomic chain of developments, the committee urged immediate adjustment of refinery yields.

If the current yields were continued through the coming winter, gasoline would be overproduced in District 1, 2, 3, and 4 by 106,000 barrels daily, with a shortage in residual fuel oil production of 88,000 barrels daily. The fuel oil shortage could be met in part by the conversion of the indicated surplus of distillate to heavy fuel oil. Limitations in available gasoline storage would further aggravate this underproduction of fuel oil.

The entire situation is complicated by the necessity of maintaining full production of war products, which requires certain levels of crude runs and gasoline production. Due to the necessity of preserving gasoline outlet for war product plants, a large proportion of the crude available for running in non-war product plants will have to be processed in a simple topping operation. This lack of balance will increase as more refinery facilities are installed for the manufacture of war products.

Table Showing Changes in Percentage Gasoline Yields by Refinery Districts Necessary to Create a Balanced Situation After Gasoline Rationing Is Imposed

	1941 Actual	4 Weeks Ended Oct. 24 Act. 1	Nov.-Mar. 1942-43 Estimated	Remainder 1943 Estimated
DISTRICT I.	39.4	37.9	37.7	38.2
DISTRICT II.	52.2	45.2	39.8	42.7
DISTRICT III.	44.4	38.7	35.5	39.0
DISTRICT IV.	50.6	40.7	44.2	43.9

The committee offered the following suggestions and recommendations to meet the situation:

(A) Every effort should be made to speed up completion of all transportation projects relating to the delivery of oil to the Eastern Seaboard.

(B) Feeder lines which are to supply heating oil to the big-inch line from the Corpus Christi, Houston and Beaumont-Port Arthur refining should be in full operation by the time the line is ready to receive supplies. The big line should be filled with heating oil because this will accomplish delivery of a needed product during the most critical (winter) time, ample stocks of distillate oil are available in District 3, and this will add to flexibility in operation of refineries producing essential war products.

(C) Further effort should be made toward increasing tank car movements to the Eastern Seaboard by expediting of trainload lots, by pooling of facilities, by other steps.

(D) Prompt consideration should be given to a reduction of gasoline rationing allowances in the Atlantic area.

(E) Upon the exhaustion of the first three recommendations listed above, the only alternative remaining is allocation of additional tankers for deliveries to the East Coast.

(A) The necessity of altering refinery yields in advance of the development of serious unbalances is so great that increased and prompt attention should be given to the development of a program. The committee recommended OPC give attention to this matter.

(B) Further study also is needed on the relationship of the production of aviation gasoline, toluene, butadiene, and other war materials to the levels of crude runs and refinery yields and the effect on non-war product refineries.

The committee also made some general recommendations, including further conversion of distillate and residual fuel oils users to coal in District 1 area.

Institute Warned Transportation May Become Serious Bottleneck

Automotive transportation may easily become the most serious bottleneck restricting the participation of the oil industry in all-out war effort, as was pointed out to the group session on automotive transportation, meeting as part of the 23rd annual session of the American Petroleum Institute.

There is too much feeling that the industry will get equipment as it needs it, and too little attempt to carry truck conservation endeavor to the men who, literally, are behind the wheel, according to the speakers, who were most emphatic in asserting that without concerted effort and greatly increased interest the highway transportation of the industry could fail completely before the seriousness of its position was appreciated, much less before corrective measures could be put into effect.

Discussing the subject "Wartime Regulations of Petroleum Carriers," S. F. Niness, chief, Petroleum Carriers Section, Division of Motor Transport, ODT, traced the formulation of orders which led to the creation of the division which he heads, showing how all tank trucks regardless of service in which they are employed, are under ODT direction.

Following an inventory of available equipment, an attempt was made to evaluate the census on a basis of corresponding trucks in new condition. The degree of efficiency was found to be about 50 percent, indicating possible increased haulage without serious change in present operations.

To speed up tank trucks, they were excepted from all ODT orders except those calling for Certificates of War Necessity and the one setting maximum speeds at 35 miles per hour.

In conferences with OPA the ODT was able to make provisions which would eliminate delay or interruption to service which might otherwise occur through rate changes. The ease of tank truck operation in interstate commerce has also been handled as one of the restricting problems.

The speaker declared that tank trucks can take over more of the 100- to 200-mile deliveries through reduction in local deliveries, full and unstinted aid of the ODT being pledged to working out satisfactory answers to this many-sided problem.

It is obvious that tank trucks cannot take over all of the 200-mile hauls, in fact, they cannot absorb all the 100-mile hauls. It is considered probable, then, that steps will be taken to permit review and examination of all tank truck hauls over 100 miles to obtain assurance that no unnecessary long hauls are being made, and that the type of transportation best adapted to the particular movement is being used.

In closing, the speaker emphasized the thought that present synthetic rubber programs do not offer much help toward solving the tire problems of the tank truck industry. Conservation of every pound of rubber now available was strongly urged.

R. S. Williams, Vehicle Maintenance Section, Division of Motor Transport, ODT, discussed "Wartime Automotive Maintenance," stressing that the present roll of some 5,000,000 trucks now on the road represents all the trucks which will be available to fill transportation needs for a long time to come.

The speaker defined the problem of getting longer life from equipment as a purely personal one. The average driver is not, as is the case with a passenger

car, the owner of the vehicle. He is interested in the truck as a means of livelihood, and has in most cases been given no instructions, has not been sold on the idea of making a personal effort to prolong the life of the vehicle.

Singling out the oil industry's 130,000 trucks, and showing them to be only two percent of the nation's necessary, present truck fleet, the speaker showed how converting the industry's drivers to truck life extension was not enough. It would help, of course, but the real value of the oil industry lies in spreading the doctrine of selling truck drivers on truck conservation. No other industry is in position to contact practically all of the five million truck drivers, no other can better set an example, on the road, of proper truck care and effective, conservative driving. Too, the rural tank truck driver contacts other truck users who, if not on the road as consistently as the motor transportation driver, drive many miles per year—the farmers. The driver, if thoroughly sold on the merits of the Truck Conservation Corps, and with his emblem to start the ball to rolling, can do much to enlist the vast fleet of farm truck drivers—who in this case usually are also owners—in their personal gain through conservation of their trucks and their accessories.

In closing, the speaker pointed out that thorough-going participation in the campaign to obtain truck conservation, in addition to contributing to the war effort, was of inestimable value in maintaining each company's territory in condition to be an effective market in post-war days, toward the better serving of which the maintenance of a live-wire organization would be invaluable. Williams stated, "We must conserve our dwindling and irreplaceable supply. Without trucks, 54,000 communities would be practically cut off from the world. Without trucks, we could not move our bountiful supply of food products from the farms to our armed forces. No matter how our views of how to do the job differ, we've got to save our trucks, and keep 'em rolling."

Surveying "Wartime Problems of Petroleum Carriers," J. F. Winchester, Standard Oil Company of New Jersey, pointed out the need for even greater improvements in tank trucks in order that they might be adapted to and used upon vehicles now being supplied to the army. Calling attention to losses in personnel already suffered through transfer to the armed forces, the industry was warned that this draft will become worse instead of better.

He strongly advocated that the petroleum transportation industry in all its ramifications be given A1 rating as regards pooling of trucks, repair parts, rubber for the vehicles, and even expansion, should this prove advisable. This was urged because of the fact that if the industry fails to deliver the goods, and thus maintain the distribution of products, common and contract plants, defense plants, armed forces and all others will suffer in consequence.

The passenger cars, regarded by most rationing boards and other authorities as dispensable, were rated by the speaker as essential to the industry and its contribution to the war effort. They are shown to be the only vehicles available to many field workers, and even in the marketing division they serve dual roles as transportation for supervisors and for maintenance.

The speaker voiced his skepticism of the planned registration of commercial vehicles, citing former surveys and failure to utilize the data gathered. He expressed the feeling that an ideal state of affairs would be for the ODT to consider turning over the registration of vehicles to established agencies within given states as a means of overcoming present complications and bringing about an economy in government.

The fact that many oil industry trucks were already being operated on recaps or retreaded tires before the present emergency arose was stressed. This means that the industry does not have available the backlog of tire miles which it is supposed to have, and that breakdown, or at least serious retarding, of the transportation industry will soon occur. A plea was made for the provision of tires of new rubber for trucks carrying loads of 40,000 pounds or over, citing instances where inadequate tire equipment slowed up and delayed war effort, maneuvers of the armed forces, and other critical transportation.

The speaker stressed the value of the 35-mile maximum speed. To this should be added a thorough daily checking of all truck tires and the repair of minor injuries at once. Maximum tire life, he insisted, could be secured only when fleet owners were permitted to interchange tires throughout his fleet, instead of being required to keep the five tires on the one vehicle. The breaking in of new tires in fall or winter, rather than spring or summer, was also brought out as a further aid to prolonged tire life.

Other problems of the petroleum carriers which are altered and emphasized by wartime conditions are the important ones of repairs to motor equipment safety and delivery systems.

In each of these the effect of drawn-out service life of equipment is shown to have a vital effect on demands made of the industry, with a plea for revising restrictions on parts and altering delivery systems so as to speed up repairs and permit savings in mileage by adjustment of delivery of present-day competitive products.

Boyd Continues As API Head; Other Officers Reelected

William R. Boyd, Jr., president, and all other officers of the American Petroleum Institute were re-elected by the board of directors at the Institute's 23rd annual meeting at Chicago. Members of the Institute elected 48 to the board of directors, and the board itself elected 11 directors. The executive and membership committees of the board, and the Institute's American Petroleum Industries Committee also were re-elected.

In addition to Boyd, the reelected officers are: George A. Hill, Jr., Houston Oil Company of Texas, Houston, vice president for production; J. Howard Pew, Sun Oil Company, Philadelphia, vice president for refining; E. V. Weber, Eureka Oil Company, Cincinnati, vice president for marketing; O. D. Donnell, The Ohio Oil Company, Findlay, Ohio, treasurer; and Lacey Walker, American Petroleum Institute, New York, secretary and assistant treasurer.

The 48 members of the board, nominated by the board of councillors and elected by the membership, are: Production group, Pacific Coast: Dana Hogan, Hogan Petroleum Company, Los Angeles; R. C. Stoner, Standard Oil Company of California, San Francisco; and W. C. Whaley, Barnsdall Oil Company, Los Angeles; Central United States: J. S. Bridwell, Bridwell Oil Company, Wichita Falls, Texas; Amon Carter, Star Telegram, Fort Worth; E. De Golyer, Dallas, Texas; H. L. Hunt, Hunt Oil Company, Dallas; C. P. McGaha, Fain & McGaha, Wichita Falls, Texas; E. H. Salrin, Tide Water Associated Oil Company, Houston; and E. L. Smith, Dallas; Eastern United States: O. D. Donnell, The Ohio Oil Company, Findlay, Ohio; and F. A. Leovy, Gulf Oil Corporation, Pittsburgh.

Refining group, Pacific Coast: S. Belither, Shell Oil Company, Inc., San Francisco; and W. L. Stewart, Union Oil Company of California, Los Angeles; Central United States: C. M. Boggs, The Kanotex Refining Company, Arkansas City, Kansas; C. L. Henderson, Vickers Petroleum Company, Wichita, Kansas; and Roy B. Jones, Panhandle Producing & Refining Company, Wichita Falls, Texas; Eastern United States: Paul G. Blazer, Ashland Refiing Company, Ashland, Kentucky; Harry Logan, United Refining Company, Warren, Pennsylvania; and

Charles L. Suhr, The Pennzoil Company, Oil City, Pennsylvania.

Marketing group, Pacific Coast: Reese H. Taylor, Union Oil Company of California, Los Angeles; Central United States: K. S. Adams, Phillips Petroleum Company, Bartlesville, Oklahoma; B. L. Majewski, Deep Rock Oil Corporation, Chicago; and W. G. Skelly, Skelly Oil Company, Tulsa; Eastern United States: C. E. Arnott, Socony-Vacuum Oil Company, Inc., New York; W. V. Hartmann, Gulf Refining Company, Pittsburgh; and W. E. Smith, Standard Oil Company (Kentucky), Louisville, Kentucky.

Transportation group, Pipe Lines: E. J. Henry, The Atlantic Refining Company, Philadelphia; and Harry Moreland, Great Lakes Pipe Line Company, Kansas City; Tank cars: L. J. Drake, Union Tank Car Company, Chicago.

Supply group: Guy Tompson, Bethlehem Supply Company, Tulsa; Ferd Spang, Spang & Company, Butler, Pennsylvania; and A. E. Walker, National Supply Company, Pittsburgh.

Natural gas group: J. D. Creveling, Panhandle Eastern Pipe Line Company, New York.

Natural gasoline group: W. K. Warren, Warren Petroleum Corporation, Tulsa.

At large group: J. A. Brown, Socony-Vacuum Oil Company, New York; Frank Buttram, Buttram Petroleum Company, Oklahoma City; Jacob France, Mid-Continent Petroleum Corporation, Baltimore; Wirt Franklin, Franklin Petroleum Corporation, Ardmore, Oklahoma; H. D. Frueauff, Cities Service Company, New York; S. A. Guiberson, Jr., Guiberson Oil Company, Dallas; J. C. Hunter, Mid-Continent Oil & Gas Association, Abilene, Texas; A. C. Mattei, Honolulu Oil Corporation, San Francisco; A. W. Peake, Standard Oil Company (Indiana), Chicago; Charles F. Roeser, Roeser & Pendleton, Fort Worth; R. van der Woude, Shell Union Oil Corporation, New York; Earle W. Webb, Ethyl Gasoline Corporation, New York; and Eric V. Weber, Eureka Oil Company, Cincinnati.

Forty-two of the directors were re-elected. The others replaced 1942 members, as follows: Whaley succeeds R. A. Broomfield; Stoner, L. P. St. Clair; Tompson, J. A. Crawford; Spang, W. L. Childs (deceased); Peake, C. J. Barkdull; and Mattei, William N. Davis.

The 11 members elected by the board are: William Bell, Bell Brothers, Robinson, Illinois; Arthur F. Corwin, Socony-Vacuum Oil Company, Inc., New York; H. R. Gallagher, Woodside, California; H. N. Greis, Deep Rock Oil Corporation, Tulsa; Walter S. Hallanan, Plymouth Oil Company, Pittsburgh; Lindsay Hanna, Standard Oil Company of California, San Francisco; Ralph B. Lloyd, Lloyd Corporation, Los Angeles; Parker Melvin, Towne-Melvin Oil Company, Bradford, Pennsylvania; R. W. McDowell, Mid-Continent Petroleum Corporation, Tulsa; Henry D. Moyle, Wasatch Refining Company, Salt Lake City; and Robert E. Wilson, Pan American Petroleum & Transport Company, New York.

Five members were relected. Those elected to succeed others are: Hanna, to succeed Ralph K. Davies; Wilson, J. D. Collett (deceased); Corwin, to fill the unexpired term of E. R. Brown (deceased); Greis, E. H. Moore, resigned; Moyle, T. A. Dines, resigned; and Hallanan, Ralph T. Zook, resigned.

Conditioning Oil Wells for Secondary Recovery

By F. R. COZZENS, Equity Oil & Gas Company

SUCCESS or failure of any secondary oil-recovery measure depends largely upon the condition of the producing sand. We know by coring and by various other research methods that in the process of normal pumping, water, gas, air, or sundry oxides gradually fill cavities from which oil is wtihdrawn, and that certain areas of sand become paraffined and crystalized, especially at or near the sand-face of production wells. The extent to which a sand-face is thus affected determines the speed and efficiency of a recovery measure, and since practically all sand-bodies which have passed the peak of production are more or less affected, operators are finding it advisable to give their wells, especially induction wells, some form of preliminary treatment—even in the Eastern stripper area where every item of expense must be scrutinized with care.

An oil and soap solution forms the basic treatment in Eastern areas and the process is put into effect when the wells can no longer be pumped at a profit. While the pumping equipment is still intact the reservoir or shot-hole at the bottom of a well is filled nearly to capacity with live oil into which has been stirred soap chips or granulated soap, in proportion of 5 pounds of soap to each barrel of oil. Six to 10 barrels of this solution are generally needed for each well. The lead line in the tubing is next connected with the gas vent in the casinghead and the well is circulated continuously for a period of 36 to 48 hours, then pumped dry. In the pumping out process, the oil and soap solution is conducted to a tank, where, after the residue has settled out the oil is drawn off, mixed with about the same amount of soap as before, then again introduced into the well for another circulation.

After two or three intermittent circulations of this kind, during which a careful observation is made as to type of residue pumped out, the big majority of wells show an increasing amount of live oil and gas. This is proof that the face of the reservoir has been washed clean and old channels opened.

When a well fails to show such improvement, and there is an excess of paraffin in the residue, it is advisable to treat the reservoir with some form of paraffin solvent before the final oil-and-soap circulation is given. There are several such solvents, commercially manufactured, which can be inducted and circulated in a well without changing the pumping equipment. In certain wells having a lime pay-formation, an induction of hydrochloric acid into the reservoir is far more effective than a paraffin solvent.

Light charges (50 to 100 pounds), of gelatin, or similar form of solidified nitroglycerine, have helped in many instances. Tubing and rods must, of course, be removed but it is rarely necessary to lift the casing. To confine the force of the blast to the reservoir chamber, a plug of burlap, wood, or some such material is driven down the hole and wedged in the sand-shoulder below the bottom of the casing. These light explosive charges, commonly called squibs, are hung suspendde in the desired area of the sand reservoir, and detonation is made by insulated wire and electric blasting cap. Spoil is removed by bailer after the blast, and a twenty-four-hour circulation of oil and soap solution completes the process. Enterprising operators rig up a reel over the well to handle the bailing out job, thus eliminating the expense of bringing in regular cleaning-out machinery.

While designed primarily for use in induction wells, these forms of treatment are proving highly successful also with wells which are to be left open for pumping. Whether the secondary recovery measure be gas or air drive, water flooding, or vacuum (suction pump), the initial effect on the production area is speedier. A more uniform pressure can be built up against the sand-body, and less force is required from the power unit, because resistance due to clogged faces of well reservoirs has been lowered. Considering the labor and expense of operating oil-recovery equipment, this initial saving alone amply repays the cost of treating wells.

On one Southern Ohio recovery drive comprising 24 wells, where all wells had been treated, less than 100 pounds air pressure was needed to force oil through the pay sand, whereas a 300 to 450 pound pressure was necessary in the same sand in an adjoining area where wells were left untreated. Various other tests have shown similar results, and in more than 70 percent of cases beneficial production effects were noticed 3 to 10 days sooner in treated wells. Treatments generally are carried out at costs ranging from $5.00 to $20.00 per well. Oil used for the purpose can in most cases be reclaimed, and wells are treated by the average field crew without the need of any expensive equipment.

Institute Technical Groups Stress Conservation and Transportation

Wartime factors affecting the field departments of the oil industry furnished the theme for most of the papers presented before the sessions of the Division of Production, American Petroleum Institute, during the 23rd annual meeting of that body, in Chicago, November 9 to 12.

In the session devoted to drilling and production practices, drilling mud, multiple-zone completions, crude oil shrinkage in the changeover from reservoir to above-ground conditions, and the hydration-pressure relationships in clays and heaving shales were discussed, three of the papers being general reviews of recent advances in the subjects covered by the several authors.

Under the overall heading on pipe line transportation problems, speakers covered the subjects of cathodic protection of pipe lines, with special emphasis on certain types of circuits wherein adjoining lines, not cathodically protected, are attacked by reason of the coverage afforded the offending system.

Volumeters were reviewed in the light of replies to a questionnaire sent out to some 43 larger companies, in an attempt to determine the extent to which these instruments are used, to discover their weaknesses, if any, and to permit the planning of possible standardization in their employ in the industry. The volumeter was found to be satisfactory for many unusual services, including the checking of actual and total volumes of salt water produced.

Conservation and allocation practices, in their relationship to present war shifts of production demand, and as a means for furnishing greater quantities of field products with a minimum of exploitation, were the theme of a special session. Present practices were reviewed, and the coordination of conservation practices in the various states studied with a view toward ironing out the inequalities which now exist and which hamper more equitable distribution of production quotas.

In addition to the regular sessions of the division of production, several papers were presented before special advisory committees, among them being one covering the enthalpy of gaseous hydrocarbon mixtures, in which a method for the prediction of enthalpy (or heat content or total heat) of certain mixtures was developed when partial data, experimental or known, permitted the consideration of a mixture as being composed of separate units, for each of which a certain amount of primary data were available.

Another of the committee papers covered the evaluation of effective displacement pressures for petroleum oil-water silica systems, in which a method is developed whereby the determination of the angle of contact between the wetting agent and the rock material permits accurate prediction of the type of drive present, whether water will displace the oil, or oil water, or if a condition of equilibrium exists and no transfer will occur.

Abstracts of technical papers presented before the sessions devoted to drilling and production practices, together with two of those read in committee only, follow:

Volumeter Practice in the Petroleum Industry

By E. E. AMBROSIUS, University of Kansas, and E. W. JACOBSON, Gulf Research and Development Company

This paper presents the results of a study of the material secured through answers to a questionnaire on volumeter practice sent to 43 individuals among the larger oil companies during the fall of 1941 by the subcommittee for joint ASME-API volumeter research of the ASME special committee on fluid meters; 35 replies were received, of which 25 answered the questions.

The subjects dealt with are: kind and quantity of liquid hydrocarbons measured with volumeters; types of meters used and variety of products handled by each type; maintenance and calibration schedules; accuracy of measurement expected or required of volumeters; ability of meters to check over extended periods of operation; kinds of calibration equipment used; accuracy of open provers versus closed provers; pressures to be maintained in closed provers; design of proving tanks; accuracy of proving-tank calibration; methods of proving calibrating proving tanks; change in proving-tank calibration with time; standing start-and-stop method of proving versus running start-and-stop method; flow rates at which meters should be calibrated; effect of temperature and viscosity changes on meter performance; error corrections for evaporation and compressibility of the measured liquid; and the problem of gas separation.

The trend of the industry is toward the use of volumeters, for all kinds of petroleum measurements, with the possible exception of the refining branch. General practice is to use each volumeter with but one product, one use being the measurement of salt water production.

Almost all users maintain on regular schedules, depending upon product handled and operating conditions. This is imperative to insure the close degree of accuracy expected.

One of the big problems is how to sign proper conditioning equipment for the liquid passing through the meter. This problem, solved in many applications, looms large in crude-oil lines wherein much gas in solution is released by reduction of pressure on the liquid. Proper handling of sand and abrasive solids which affect meter installations is a problem in some installations.

Volumeters for measuring liquid hydrocarbons are precision instruments, and must be treated as such. They are mechanical in nature; they depend on careful design, proper installation, and intelligent handling. As the precision of measurement increases, so does the cost of calibration, operation, and maintenance. A fair balance of all factors involved is required.

The Enthalpy of Gaseous Hydrocarbon Mixtures

By B. H. SAGE, R. H. OLDS and W. N. LACEY, California Institute of Technology

Information concerning the enthalpy (also known as heat content and total heat) of hydrocarbon mixtures is of value in establishing the heat and work associated with the changes in state that accompany the production and refining of petroleum. At present direct experimental information relating to the subject is sparse, and frequently it becomes necessary to predict the enthalpy of a mixture from a knowledge of the mixture's composition and the prevailing pressure and temperature. This discussion deals with a method for predicting the enthalpy of gaseous hydrocarbon mixtures, and presents tentative data for use at temperatures between 100 and 250 degrees F. for pressures up to 3000 pounds psi.

Strictly speaking, such properties of a mixture as enthalpy and specific volume are unique functions of the state of the system under consideration, but efforts have been made to correlate the behavior of mixtures with that of their components. If it is assumed that the gas phase is an ideal solution, it follows that the enthalpy of any mixture may be ascertained from the enthalpies of the components in the same type of phase, an equation being stated to cover the condition. Actual gaseous mixtures follow that relationship at infinite attenuation, and therefore the equation may be employed to establish the enthalpy at the specified condition.

The authors cite the experimental background upon which available data are predicated, stating that it is evident from their citation that at present the knowledge of the partial behavior of the components in gaseous hydrocarbon mixtures is far from complete. They do use the facts at hand to illustrate and

test the method, demonstrating its applicability with a detailed consideration of natural gas, in which all of the propane and isobutane are treated as though they were nbutane, whereas the pentanes and components of greater molecular weight are treated as npentane.

Working from tables of partial enthalpies of nbutane and npentane, partial enthalpies for the mixture are obtained at the temperature and pressure in question and the corresponding weight fraction of the component. The authors believe that linear interpolation may be employed in the utilization of tabulated data without introducing appreciable uncertainties.

Comparing predicted and experimental values, the authors state that at infinite attenuation the agreement between experimental and calculated values is good, indicating that the utilization of partial enthalpies to represent the behavior of all the components in a natural gas has not introduced significant uncertainties in estimating the effect of temperature upon enthalpy at low pressures.

A Review of Multiple-Zone Well Completions

By I. W. ALCORN, Pure Oil Company, and W. A. ALEXANDER, Shell Oil Company, Inc.

This paper is substantially a progress report of experience on multiple-zone practice accumulated by the industry to date. It is apparent through the authors' discussion that for the most part reliable data at present are limited to the earlier stages of multiple zone production. Sufficient representative data on the later life of mutiple-zone wells (especially during the period of artificial lift) are not as yet available to permit drawing conclusions as to the ultimate overall practicability of the method. Nevertheless, on the basis of data submitted and analyzed, it appears to be possible to arrive at some general conclusions, outlined as follows:

It is indicated that the initial completion of wells in more than one producing zone can be accomplished successfully. Initial multiple completion may be expected to result in a saving of about 45 percent in steel consumption and approximately 40 percent in drilling costs, as compared with the drilling of two standard wells, one to each formation.

It does not follow that successful initial multiple-zone completion will yield as satisfactory results as would single wells. It is felt that, generally speaking, this type of completion offers promise of being entirely satisfactory where consolidated productive formations exist and where final fluid volumes handled will come within limits of permanent equipment in the well. On the other hand, when serious operating problems could be anticipated as a result of multiple completion, practicability would be questionable. If sand conditions necessitated screening of both zones, or if frequent work-over jobs were required, the overall result of a multiple completion might be distinctly unfavorable.

Insufficient data under different conditions existing preclude any firm conclusions regarding the application of artificial lift in multiple-zone wells.

It is indicated that the average operating costs for multiple completions will probably be greater than for standard completions. Perhaps lower initial well investment, together with benefits accruing as a result of undeferred production, would offset increased production costs.

Finally, the authors state, in spite of uncertainties involved, necessity under existing conditions to produce the most oil with least steel expenditure encourages consideration of multiple-zone completions. Most problems appear to be mechanical ones. In this early stage of development, the practice has already commanded the attention of both operators and manufacturers. The present situation concerning critical materials may be expected to result in accelerated development of improved equipment and more advanced methods of application.

An Analysis of Certain Circuits in Cathodic Protection

By GORDON N. SCOTT, Pipeline Technologist

Seeking a solution to the problem of avoiding damage to pipe lines which lie adjacent to a cathodically protected line, the author has found that a simple relationship exists between the concerned pipe lies in their ability to pass current through the wires bonding them together. This relation is susceptible of expression as a linear agebraic equation by which the external resistance of the circuit usually can be measured.

This relationship has practical usefulness:

1. In designing a drainage bond, which is a wire connecting the two pipe lines, and controlling the amount of current passing between them.
2. In testing the efficiency of an insulated flange for current leakage, to prevent consequent damage to the pipe.
3. In measuring the current density at which point the pipe becomes polarized, to decide when sufficient cathodic protection has been applied to the structure to protect it.
4. In measuring the polarization as a test for the corrosivity of the soil.

Application of this principle of measurement, this algebraic equation, results in more useful information than ordinarily is obtained by an instrument designed for a particular measurement. For example, a potentiometer customarily is used to make a certain type of measurement on a pipe line. Applying the author's worked-out relation, in connection with a multi-range current-drawing instrument, not only yields the potentiometric reading, but also yields information on the resistance of the reference electrode used, as well as on the resistivity of the soil, and the total amount of current that can be drawn normally through a system.

Understanding this relationship helps considerably to clarify the meaning of many other measurements which are daily made by workers in cathodic protection, and explains simply many problems and phenomena encountered in electrical protection of pipe lines.

Typical diagrammatic circuits and curves showing effect of polarization and for leakage determination accompany the paper.

Hydration-Pressure Relationships In Clays and Heaving Shales

By H. H. POWER, BARNABY L. TOWLE and JOSEPH B. PLAZA, University of Texas

Some shales are thought to heave into the bore hole of drilling wells because of the inclusion of varying quantities of clay materials which swell and expand when wetted by water from the drilling mud. The expanded shale not only fills the hole a great distance above the point of entry, but in some cases also exerts sufficient pressure to crush the steel casing.

Most of the literature available on swelling is confined to descriptions of experiments performed with the so-called elastic gels. Hence, opportunity exists for research in this field with due regard for the accomplishments to date in allied investigations.

The research program conducted by the authors during the past year had for its purpose the development of an apparatus and technique for studying hydration-pressure phenomena of bentonitic and other clay materials, including heaving shale. It was thought that a direct attack on the rate of pressure increases would constitute an important addition to the studies previously made on bentonitic suspensions.

The apparatus finally adopted consists essentially of a cylinder made from one piece of cold-rolled shafting, one end closed with perforated disk and blotting paper. The other end is closed with steel plug and leads for the attachment of steel tubing. The perforated end is set in a reagent chamber, the contents of which may be measured by a burette.

Wyoming bentonite was used for preliminary tests, samples being prepared by insuring dispersion of the material through additives and stirring 2 hours per day for 2 weeks. The suspension was electrodialyzed for one week with a current of 0.1 amperes at 110 volts, the dialyzed material being redispersed with the mechanical stirrer.

Although not sufficient number of tests were run to justify detailed observations, it was noted that the pressure-time relation followed the empirical equation developed by the authors, and that the pressures developed clearly showed the destructive potentialities of swelling bentonitic materials. It was noted that the absorbed liquid in the tests did not permeate the entire sample. A portion immediately adjacent to the base plate imbibed liquid, and seemed then to seal off further progress of the wetting.

The authors in conclusion state that the present work was intended only as an extended test of the hydration-pressure bomb. No single line of investigation was followed rigidly. They expect that future work with the bomb will make possible more thorough investigations, particularly from the standpoint of pressure reduction by means of added chemicals. From the data gathered, the authors conclude:

1. Materials of the type represented by Wyoming bentonite are capable of producing pressures of considerable magnitude when confined during hydration.
2. Although the data on this point are not conclusive, it is thought that the nature of the exchangeable bases present will determine to a large extent the swelling-pressure characteristic of a clay material.
3. A study of existing information regarding the increase of thickness and charge of the outer layer of the micelle as influenced by added electrolytes may provide a means for predicting relative maximum pressures attainable in the apparatus described. Additional ex-

perimental work will be of interest concerning such predictions.

4. In the early states of hydration, the swelling process follows a relationship of the type:

$$P = KT^n.$$

Prediction of the Shrinkage of Crude Oils

By D. L. KATZ,
University of Michigan

Crude oil in a natural reservoir under pressure contains dissolved gases; and, as the crude oil travels from the reservoir to the lease storage tank, the volume of the oil decreases. One barrel of oil in the lease tank may require 1.2 barrels of reservoir fluid to be produced. The reduction in volume of the reservoir fluid caused by reduction in temperature and by the liberation of the natural gas customarily is described as the shrinkage of the oil.

Laboratory measurements are made of this gas-liberation or shrinkage process to give actual shrinkage values for use with specific reservoirs. However, in many cases a particular engineer may not have available the shrinkage data for a given reservoir, and it may be necessary for him to estimate this shrinkage. Any computation of oil and gas reserves must include a shrinkage factor to convert reservoir oil to stock-tank oil.

This report covers several methods for predicting the shrinkage of a reservoir crude oil when such field data as reservoir pressure, reservoir temperature, solubility of the gas in the field, lease-tank crude oil gravity, and gravity of the gas are given for the reservoir under consideration. When all these items are known, the method is straightforward and reliable; whereas if only solubility, crude-oil gravity, reservoir pressure and reservoir temperature are known, the method becomes less reliable. For cases in which only the crude oil gravity, reservoir temperature, and reservoir pressure are available, even more approximate methods are presented. A rough method for prediction of the solubility of gas in the crude oil from saturation pressure and crude oil gravity follows the shrinkage calculations.

The shrinkage calculations do not depend upon the separation process, i.e., flash or differential vaporization of the gas; because the properties of the resulting gas and liquid, as well as the quantity of gas liberated, compensate for any changes in the shrinkage value.

Methods for making the required calculations are given, together with tables affording comparison of experimental and calculated shrinkages under the different sets of known factors enumerated.

Five methods of predicting the shrinkage of reservoir crude oil when the dissolved gas is liberated have been described for cases wherein experimental shrinkages were not available. These methods are of decreasing accuracy for decreasing amounts of information available to predict the shrinkage. The methods are: 1, computation of the shrinkage when the gas analysis of the liberated gas, quantity of liberated gas or solubility, saturation pressure, saturation temperature and residual crude oil gravity are known; 2, calculation of shrinkage when the gravity of the liberated gas, quantity of liberated gas or solubility, residual crude-oil gravity, saturation temperature, and saturation pressure are given; 3, calculation of shrinkage when the quantity of gas liberated or solubility, residual crude-oil gravity, saturation pressure, and saturation temperature are known; 4, calculation of the shrinkage when the solubility of the gas and saturation or vaporization temperature are known; and, 5, calculation of shrinkage when only crude-oil gravity, saturation pressure, and saturation temperature are known.

The Use of Secondary Recovery Methods as an Aid in the War Effort

By PAUL D. TORREY, Houston

Secondary recovery methods of the United States were reviewed to show progress of such methods and their points of most economic applicability. New York and Pennsylvania, for instance, are almost 100 percent dependent upon such recovery methods for their production, while farther west, in West Virginia and Ohio, the methods proven practical in New York are finding wider applications as fields become depleted.

Other states, still farther west, such as Illinois and Michigan, have essayed secondary recovery, with little success in Michigan, and with arrested development in Illinois, where discovery of new flush production relegated the slower and more expensive secondary methods temporarily to the background.

Throughout Oklahoma, the Texas Panhandle and North Texas secondary methods are proving their worth, a table being cited to show the estimated amount of oil reserves to be made available through application of secondary recovery to fields now uneconomic under present production schedules.

Secondary recovery is economically more desirable than shale-oil recovery or mining methods of production, and if properly carried out, will relegate far into the future the exploitation of such methods as source of petroleum.

The fact that much of the oil ideally suited to secondary recovery lies in territories near the greatest crude demands, and at points where transportation facilities are least cramped is another reason why secondary recovery can aid greatly in providing those augmented oil inventories called for by the war effort.

A Review of Recent Advances in Drilling-Mud Control

By PRESTON E. CHANEY,
Sun Oil Company

Research engineers of the oil industry, universities and commercial mud and chemical companies have sought and found explanations for many of the peculiarities of mud behavior. Consequently they are able to predict more accurately than before the response of mud to various treatments and, in many cases, to avoid trouble as well as correct it.

The field mud engineer often does not have the opportunity to keep abreast of laboratory progress, and often the research approach seems too theoretical for field use.

In this paper the author attempts to bridge the gap between laboratory and field practice. The paper has been written primarily from a practical standpoint, and most controversial points of theory have been omitted in order to avoid confusion. All methods of mud treatment suggested by the author have been used successfully and commercially in the field.

Outlining essential tests of mud condition, daily or more often in case of trouble, the author specifies the checking of weight, in any one of the commonly accepted systems; viscosity, in seconds (Marsh-funnel), adding the footnote that when commercial weighting materials are used and in all deep drilling, weight and viscosity should be determined at frequent intervals. Other factors to be checked are sand and total solids; pH; 30-minute filter test; salt, (reported as parts per million of chloride); and remarks showing any unusual characteristics of mud. These tests are covered by API standard procedures.

Hydration of clay colloids is discussed, both hydrophobic and hydrophylic types being considered; the effect of pH variation on clay colloids is studied; the viscosity relationships of clay suspensions taken up and covered under three headings: 1, repulsive forces between clay particles, 2, hydration of clay particles, and, 3, attractive forces between clay particles. Chemicals, cement, gas and salt are discussed in their relation to colloid behaviour, with discussion of heaving shale and lost circulation.

The author concludes with the belief that a more thorough application of the fundamental principles of colloid chemistry, as opposed to the trial-and-error methods of the past, will pay dividends in economical and less troublesome drilling operations.

Often a treatment which gives temporary relief from a particular mud problem may itself cause more serious difficulties at a later date. Therefore, the author advises an attempt to look ahead in mud treatment, and to prevent the occurrence of trouble whenever possible. Credit is due the engineer who quickly and economically can correct mud troubles which endanger or delay the drilling operation, but even greater recognition should be given to the less spectacular efforts of those who, by foresight, avoid these costly delays and difficulties.

Closer cooperation between the research and the field engineers is necessary if rapid improvement in field mud-treatment methods and the fullest utilization of research data are to be achieved.

Pressure Maintenance by Injection of Produced Salt Water in the East Texas Field

By J. ZEPPA, Delta Drilling Company

Presenting the present status of the East Texas field as regards the zone of salt water intrusion, attention was called to the spotty nature of the advancing front, and also to the extensive area from which salt water is now being produced with the oil. Some 5000 wells out of the more than 25,000 in the field are producing water in amounts exceeding 100 barrels of water per well per day, less than 700 of them accounting for more than 300 barrels per well per day.

Normally bottom hole pressure controls production rate, but in the East Texas field the converse is true, the production being held within limits which tend to maintain the existing

pressure. Dropping from around 1600 pounds at discovery of the field, the pressure on January 1, 1942, stood at 1020 pounds, a level which has been closely maintained throughout the year to date. To accomplish this, it has been necessary to restrict production to maintain a total flow from the field—water as well as oil—to around 800,000 barrels per day. As the salt water production increased, it was necessary to cut oil produced.

Salt water, in such fields as East Texas, is a necessary part of production, it being the driving force behind the flow, and thus is a natural result of oil recovery. Initial attempts at returning the salt water to the producing sand was made to avoid contamination suits, the matter of aiding recovery coming later.

The East Texas Salt Water Disposal Company, organized to collect produced salt water and return it to the Woodbine and thus to maintain or even increase bottom hole pressures, will probably not be in complete operation before mid-1943, and to cover needs in the meantime the Railroad Commission is considering a plan whereby wells producing less than 20 barrels of oil and over 100 barrels of water per day will be shut in, their allowable transferred elsewhere on the lease, or to other properties, if necessary, in order that this transferred production be from wells making not to exceed 25 percent water.

This shut-in plan is a stop-gap only, to permit production from the field to continue at the desired rate, yet to avoid the mounting problem of salt-water disposal while at the same time lowering bottom-hole pressures. It is a war measure, and is to apply only until the system now under construction can handle the volumes of brine produced.

Coordination of Conservation Practices in the Various States

By E. H. DAHLGREN,
Interstate Oil Compact Commission

In fundamental principle, coordination is the basis of the Interstate Oil Compact Commission. The Commission is not clothed with arbitrary power, but only with the right to coordinate existing agencies and authorities in all branches of government, state, national and interstate. The degree of success of the principle of coordination depends upon the degree of cooperation given by the states, industry, and interstate and governmental groups.

The author then reviews conditions in oil industry which led to formation of the Commission, as the final step which began with the calling of the governors of 10 oil producing states as advisory committee. Six charter states have been joined by others to give a total 12, including all large-volume states but California.

Describing the functions of the legal and research and coordinating committees, the author points out the benefits secured through legislative aid based on studies made by the research group.

Each oil producing state is then considered separately, its condition with regard to state control being summarized and its participation, if any, with the Commission listed. The activities of each state control body outside of production limitation are also briefly reviewed.

The author concludes by stating that in the war effort the Commission is firmly following its function of furthering the conservation of oil and gas. It has established organs of investigation and research to aid the states and other agencies in playing an important part in winning the war.

At the present time consideration is being given to the feasibility and desirability of the preparation of a conservation or educational program on the subject of oil and gas conservation. The author advocates a missionary squadron of technical experts, each thoroughly trained in one phase of conservation, which could present a factual survey, presentation of principles involved, benefits, and necessary facilities to accomplish a real conservation program.

Evaluation of Effective Displacement Pressures for Petroleum Oil-Water Silica Systems

By FRANK C. BENNER, CHARLES G. DODD and F. E. BARTELL,
University of Michigan

When petroleum is produced from a reservoir, water frequently supplies at least a part of the driving force which moves the oil toward the well bore. This driving force can be hydrostatic head on water underlying the oil, but also may be the result of the tendency of the water to displace oil from the capillary rock formation. This latter displacement force acts only when water wets the rock formation to a higher degree than does the oil. The authors undertake to find out whether, or under what conditions, water wets a particular formation to a higher degree than does oil, before it can be determined whether the water drive is being utilized most effectivelv.

To designate the relative degrees of wetting in a series of liquids, the statement is made that the rock material is wetted the more highly by that liquid which causes the greater lowering of free surface energy when its liquid-air interface and a corresponding rock-material-air interface disappears to form an area of liquid-rock-material interface. Direct measurement of this free-surface-energy decrease has yet not been accomplished. The most suitable indirect method for determination of the wettability involves the measurement of the angle of contact formed between the solid rock material and the pairs of reservoir fluids concerned.

Presenting a series of curves to illustrate the various conditions which might exist, the authors checked data against experimental tests with silica plates, using the sessile-drop method with 8 different oils and drawing the following conclusions from their tests and comparison of experimental and calculated data:

The relative wettability of reservoir rock by crude oils appears to constitute a more complex problem than heretofore had been generally assumed. Certain minute constituents of the oil may influence greatly the wetting.

An evaluation of relative wetting of reservoir rock by reservoir fluids was attempted by measurement of contact angles formed by petroleum oils and water on solid silica plates. Displacement pressures calculated from contact-angle data were found in reasonable agreement with observed pressures.

It was found that receding interfacial contact angles of the systems observed invariably assumed values less than 90 degrees. By this criterion silica appeared to be better wetted by water than oil.

Results indicate that spontaneous displacement of oil from underlying solid by water should occur only in those cases wherein both advancing and receding angles are less than 90 degrees; that spontaneous displacement of water by oil should occur if both angles are greater than 90 degrees; and that no spontaneous movement should occur where the two angles are on opposite sides of 90 degrees.

Results on silica plates appear to serve as fairly reliable guide for the determination of displacement tendencies of oil by water or water by oil. Results also give fairly definite proof that crudes contain constituents which become adsorbed on siliceous surfaces, causing those surfaces to assume hydrophobic properties.

Present Allocation Practices

By D. R. McKEITHAN,
Phillips Petroleum Company

Oil and gas production is restricted for two fundamental reasons. One is to limit current supply to consumptive requirements. The other is to distribute regulated production in a manner to obtain greatest ultimate recovery. The most difficult problem involved in achieving these two primary objectives is the equitable distribution of restricted production to the various pools and wells within the respective states. This problem is aggravated at the present time because the reserves of many oil and gas fields are large enough to withstand production rates in excess of consumption demand and yet stay within the range of efficient and conservative operation.

Only in recent years have the principles of allocation been developed from a scientific and engineering standpoint, and these principles have yet to be firmly embodied in the regulatory process.

The development of allocation methods in the various oil-producing states is reviewed and analyzed, with a brief description of the administration and mechanics of the systems employed.

The conclusions drawn by the author are:

1. The oil industry is operated primarily on a competitive basis, and this factor adds to the complexity of the attainment of maximum efficiency in conservation, and allocation is extremely difficult.

2. Systems of control in the various states are geared to meet local operating conditions as well as background and temperament of the people in conformity with American standards of localized government.

3. The actual mechanics of allocation used in the various states differ greatly, and, further, it appears that one basic law or one rigid formula cannot be applied reasonably to all the varied conditions.

Vast strides toward general improvement have been made in recent years; however, there is still room for betterment; and the "Standards of Allocation of Oil Production Within Pools and Among Pools," as set out in the report of the API's special study committee on well spacing and allocation of production should be of material assistance in further progress.

Adjustability and Interchangeability Feature Rig Substructure

By JOHN C. ALBRIGHT

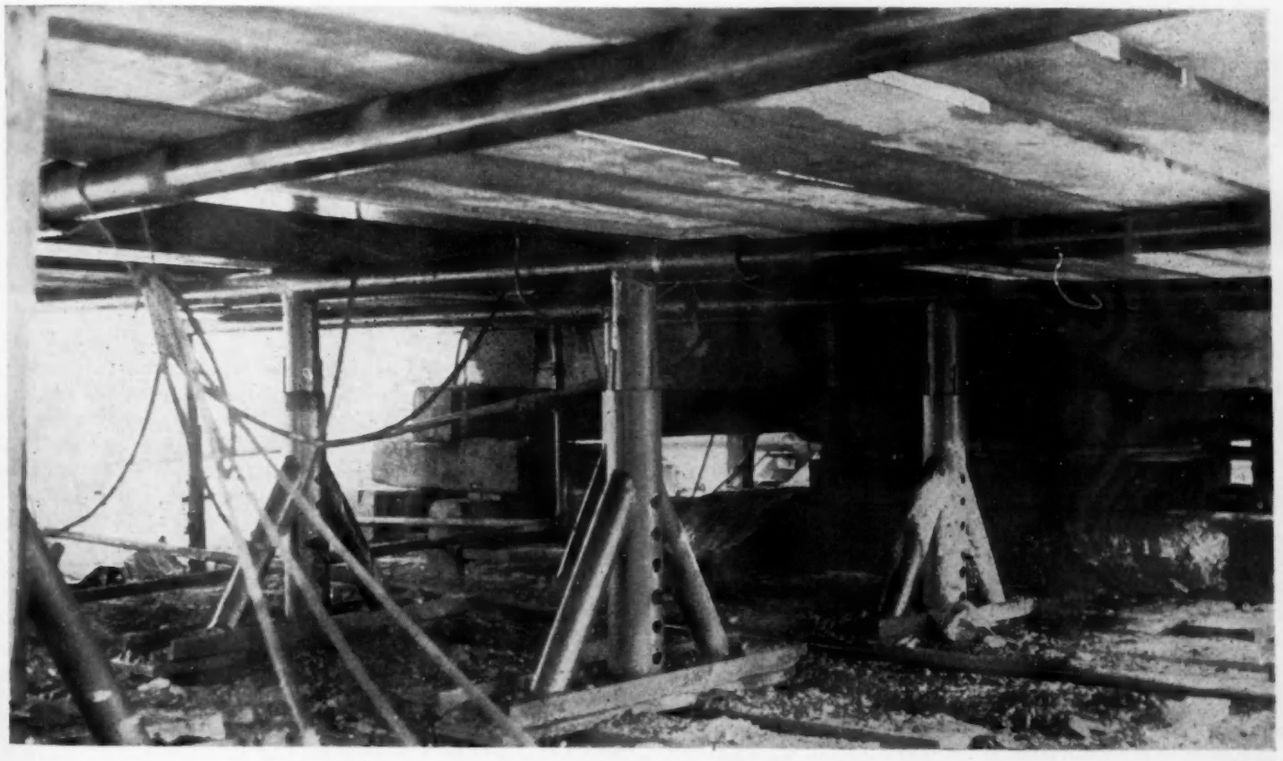
WAR has made conservation of materials a "must" order. Oil operators, like many other industries, have found it necessary to develop new and simplified substitute methods in many cases. Frequently these must be of the home-made variety from scrap material because of the inability to purchase new equipment.

Confronted with such a situation, Jack Grace, drilling contractor of Wichita Falls, set about to design a drilling rig substructure requiring no pre-fabricated parts. Using various lengths of casing and line pipe which had become unfit for use in wells and transmission system because of long use, Grace and his drillers and toolpushers have designed a substructure that has proven successful in North Texas operations.

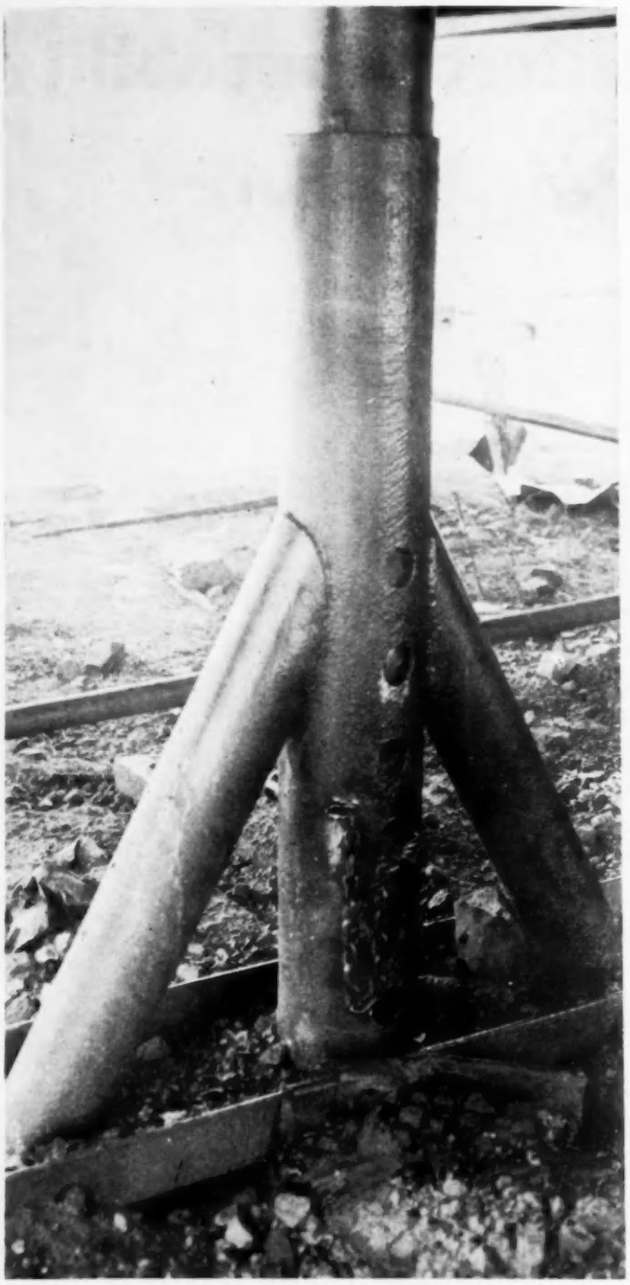
Three identical sections are built into his substructure, all interchangeable. This feature was included in the design to eliminate numbering, thereby making rigging up and tearing down easier and faster.

The three identical sections are made with pipe, the vertical sections of which require reasonably large diameter pipe in pieces about 4½ feet long cut squarely on one end for welding into the channel of the channel iron which can be any length desired. Diagonal braces are attached at an angle of 45° to the channel iron and the vertical riser to obtain the required stiffness to resist vibration and strain of supporting heavy machinery in motion. This eight-inch riser is equipped with a number of 1¼-inch holes drilled on 5-inch centers squarely through both walls. To provide equal interchangeability, the first riser made was used as a pattern for the remaining units so that the distance would be exact from the channel upwards to the first hole. The overall length of the riser is not so important as the spacing of the holes, since the upper end comes in contact with no other section, and that end can be left with threads or cut plain. Rough edges are eliminated.

Horizontal members upon which the skid frames of the engines and drawworks are placed, after the substructure is completed at the location, are made of three sections of pipe slightly smaller than the 8-inch vertical risers. Legs welded to the long horizontal supporting members are placed so that the skid frames of the engines and drawworks rest directly above the vertical supports with the channel iron footing on timber mats. These legs, one on each end of



This substructure reduces overall weight of drilling equipment and simplifies hauling installation.



Supporting post and channel-iron footing with braces and adjusting holes.

Auxiliary supporting member for walks and extension floors around drilling equipment.

the horizontal pipe, have drilled holes of the same size which are placed in the vertical risers but on closer centers so that a relative fine adjustment in height can be made by matching certain holes in the inserted pieces and the vertical risers. Ribs welded to the outer surface of the insert pipe walls have sufficient thickness to provide a close fit between the inserts and the vertical risers so that sufficient rigidity is obtained to eliminate side sway. Ribs have been found to serve better than a squeeze-fit pipe, since the bearing surfaces are smaller, and when the ribs are greased, inserting and removing the sections should not be difficult.

For extensions of the structure to place walks and boarded floors, additional pipe is required to act as sills. One end of these joints is placed in the open end of the horizontal supports below the engine skids, while the outer end is supported and leveled with a single vertical member in two parts. The lower part is similar in construction to that of the heavy vertical risers with wide channel-iron footing, but the sill supports need not be so rugged. The insert section is equipped with drilled holes on convenient centers to provide necessary adjustment for height, and the pins are attached to the risers with chains to prevent them being lost when hauling from one location to the next.

These pins are made of bar steel instead of pipe because of the weight which they support. The end designed for placing in the matching holes of the risers and insert members is rounded to provide greater ease of installing, while the other end is cut square. A ring swedged of welded to this end is for attaching the chain to connect the pins to the vertical risers for safe keeping. All holes in both the insert sections and the vertical risers are drilled the same size and on the same centers to provide complete interchange without trying to match certain pieces with the other.

Cooperation Cuts Cost of Secondary Recovery

By F. R. COZZENS
Equity Oil & Gas Company

COOPERATION has become a term of vital importance in the oil industry, and nowhere else in the producing end of the business does cooperation show better results than in secondary recovery. Time was, and not so long ago, when an operator started a recovery measure, his neighbor across the fence left his wells wide open. He reaped the reward of increased production at the other fellow's expense, and by providing no counter-pressure, he also permitted undetermined quantities of oil to be forced back into inaccessible parts of a sand where no operator can reclaim it. On the other hand, a single persistent operator has ruined countless acres of virgin territory for his neighbors by some experimental measure which benefited only himself. Such conditions still exist in isolated sections of the oil country, but the general picture is changing.

Mainly because of restrictions imposed by the war, operators are learning to make the most of what they have, and to share what they can spare. This slogan has already been favorably demonstrated in many sections of the Eastern stripper fields, where curtailment of new supplies and transportation difficulties have worked serious handicaps. In the shallow-sand fields of Southern Ohio, individual operators are using what they term a mutual-benefit plan which is showing very favorable results. On a number of such mutual projects selected at random, recovery effects were speedier than when the individual operators acted alone, and in many cases oil production costs were cut 10 to 20 percent.

The mutual-benefit plan is adaptable to wide variations of use to suit the district. Generally, it is worked out something like this: When an operator contemplates a secondary-recovery measure on his property, he notifies all neighboring operators within a radius of say, five miles. A meeting is called, and two or three outside operators who have had previous experience in that type of recovery work are also invited as guests. These meetings are not elaborate affairs, but take the form of a round-table discussion, during which the various local operators air their views on the contemplated recovery measure. Taking perhaps, the experience of one of the guests as a working basis, a rough estimate is made as to the type and amount of equipment needed, not for individual projects, but for the territory as a whole. If the contemplated recovery is favored by the majority, each local operator then lists what material he has available for the purpose. It invariably happens that an operator lacks certain items, but has a surplus of others. He may have more pipe than is needed for his project, but lacks perhaps, an air compressor. Some neighbor is likely to be short on pipe, and will gladly arrange for the loan of a compressor in exchange. As discussions continue and more ways are found to share available material, it is generally revealed that far less new equipment is needed than was expected. Pumps, compressors, cleaning outfits, pipe, and smaller sundry items are loaned or exchanged among operators in this manner, and as a result, more operators in that territory are induced to start recovery projects at or near the same time.

Since there is no ring or partnership, each operator starts and supervises his own individual project, but generally he acquaints neighboring operators with the progress of his efforts. He exercises the right to arrange equipment so as to recover the maximum amount of oil from his property, but it is mutually agreed that he protect also the rights of his neighbors especially as they apply to causing damage to sand areas, and operations in the vicinity of boundary lines. Regulations are few, other than that an operator assumes responsibility for equipment which he has borrowed, and maintains all necessary repairs while such equipment is within his possession.

In some localities, mutual plans are also arranged to conserve labor. Many skilled oil-field workers, because of full-time employment and somewhat higher wage scale, have gone into other industries, and where an oil operator can not provide year-around work for his men, their duties can often be arranged so that they may be employed part-time by neighboring operators. In this manner, crews for the operation of cleaning outfits, for laying pipe, casing of wells, etc., are made up from several operators, and so held at full-time employment in the locality. Such mutual exchange of men and materials does not kill competition. Rather, it puts it on a friendly and more economical basis.

By keeping available equipment busy, and eliminating as far as possible the need of new material, an operator is taking a long forward step in cutting oil-production costs. The big advantage, however, is that far less oil is wasted. When a large territory is processed by the same type of recovery measure and at the same time definite steps can be taken to reduce the percentage of oil which is commonly forced into inaccessible parts of a sand. Much better working knowledge of the territory is obtained, whereby intake and production wells can be charted so as to force less oil across property lines. Various other minor benefits, common to an oil-producing locality may be worked out under mutual benefit plans, and their purpose is for two main objectives: Cost reduction and waste control—both of these factors being of vital importance in modern secondary oil recovery.

New Oil and Gas Fields and New Pay Horizons Discovered in the United States in October

This report actually embraces approximately one full month's discoveries. It includes some wells completed late in September but does not include some completed in late October.

FIELD	COUNTY	DISCOVERY WELL		Miles from Nearest Field	Miles from Pipe Line	Date Spudded	Date Completed	Total Depth (Feet)	Type of Structure	Method of Discovery
		Company and Well	Location							
[1]ILLINOIS—New Fields										
Toliver	Clay	Big Chief Oil's R. Barbee 1	35-5n-6e			7-23-42	9-15-42	2887		
Amity	Richland	Boles Bros.' W. C. Petty 1	NE SE NE 10-4n-14w			8-17-42	9-29-42	2997		
Friendgrove	Wabash	Skiles et al's Wheatly 1	E NE SE 3-1s-13w			8-12-42	9-22-42	2477		
Geff West	Wayne	V. A. Thompson's Whitlook 1	CW SW NW 9-1s-7e			8-22-42	9-15-42	3141		
	Wayne	C. Robinson & Cont. Oil Co.'s C. W. Osborne 1	W NE SW 17-2s-8e				9-29-42	3250		
New Pay Horizons										
Sailor Springs South	Clay	W. C. McBride-Harrison & Hagen Comm. 1	SE NE NW 3-3n-7e			8-11-42	9-15-42	2608		
Mt. Erie	Wayne	Pure Oil's S. S. Allen 1	C SE SE 11-1s-8e			7-25-42	9- 8-42	3215		
Maunie	White	McElvain Bros.' Poole-Parr 6-C	NW SW NE 13-6s-10e				9- 8-42	2203		
Extensions										
Inman East	Gallatin	Cherry & Kidd's Kerwin 1	NE NE SW 11-8s-10e			9- 6-42	9-21-42	1851		
Markham City	Jefferson	Ohio Oil's J. Lingle 1	N SE SW 36-2s-4e			8-14-42	9-15-42	3087		
King	Jefferson	Oil Carrier's Inc. Mace 1	C NE SE 33-3s-3e			8-15-42	9-15-42	2848		
Dix	Marion	F. W. Braniger & R. Powers' Hatfield 1	C SW SE 28-1n-2e			7-25-42	9- 8-42	2109		
Mt. Erie	Wayne	Jablonski & Duncan's Totten-Skelton 1	C SW SE 35-1n-8e			8-16-42	9-15-42	3096		
Coil	Wayne	W. C. McBride's Youngblood-Gregory 1	C SW SE 19-1s-5e			7-17-42	9-15-42	2893		
INDIANA—New Fields										
	Posey	Longhorn Oil's C. A. Greathouse 2	SW NE NE 18-7s-14w				10-19-42	2925		
	Pike	Ind. Farm Bur.'s Fowler 1	SE NE SE 24-1n-7w				10-19-42	919		
KANSAS—New Fields										
	Ellis	Pryor & Lockhart's Krause 1	CE½ SE SW 17-14-19w				10- 2-42	3805		
	Rooks	Continental Oil's Berry 1	NE NE NE 11-9s-19w				10- 7-42	3456		
	McPherson	Westgate-Greenland Oil's Lilly 1	CS½ SW SE 30-17-1w				10- 7-42	2668		
	Russell	Aylward Prod.'s Ehrich 1	SW SW NW 15-13-14w				10-14-42	3295		
		Cities Serv. Oil's English 1	NE NE NE 8-25-16w				10-27-42	3815		
	Barton	Nat Appleman's Stull 1	CS½ SE SW 6-16-12w				10-31-42	3329		
KENTUCKY—New Fields										
	Henderson	Farm Bureau Oil Co.'s Burbank 1	24-Q-21				10-17-42	2316		
	Union	Robert O'Meara's N. J. Waller 1	12-P-18				10-19-42	2718		
SOUTH LOUISIANA—New Fields										
	St. Charles Parish	Gulf's Delta Securities 1, Bayou Couba area	SW NE 13-15s-21e				10- 5-42	6917		
Deer Island	Terrebonne Parish	Humble's Cont. Land & Fur 2	Sec. 24-18s-12e			7-25-42	9-29-42	11470	Deep seated dome	Seismograph
MICHIGAN—New Fields										
North Bangor	Van Buren	Fisher-McCall's Davis 1	SW SE NE 9-2s-16w	2	2	9-21-42	10-10-42	1018		Sub-surf. geology
Aetna	Missaukee	Gordon Oil's Blue 1	S½ SE SE 26-22n-6w	12	12	7-26-42	10-18-42	3840	Anticline	Sub-surf. geology
MONTANA—New Fields										
	Glacier	Ed. Reagan et al's Tribal 194	C NW NE 27-37n-7w				10-24-42	3906		
	Pondera	R. C. Tarrant's De Staffany 1	C NW NE 30-28n-1w				10-26-42	1746		

New Oil and Gas Fields and New Pay Horizons Discovered in the United States in October

Continued

FIELD	COUNTY	PRODUCING FORMATION				INITIAL PRODUCTION			Gravity of Oil	Preliminary Estimate of Ultimate Production	REMARKS
		Name	Kind	Age	Depth of Pay (Feet)	Method	24-Hr. Rate (Bbls.)	Choke (Inch)			
[1]ILLINOIS—New Fields											
Toliver	Clay	McCloskey	Lime		2790	Pump	216				
Amity	Richland	McCloskey	Lime		2961	Pump	80				Also made 54 bbls. water.
Friendgrove	Wabash	Bethel	Sandstone		2464	Pump	35				
Geff West	Wayne	Aux Vases	Sandstone		3129	Pump	100				
	Wayne	Aux Vases	Sandstone		3236	Pump	16				Also made 77 bls. water. May open new pool.
New Pay Horizons											
Sailor Springs South	Clay	Weiler	Sandstone		2597	Pump	34				Also made 9 bbls. water.
Mt. Erie	Wayne	Rosiclare	Sandstone		3068	Pump	9				Also made 22 bbls. water.
Maunie	White	Tar Springs	Sandstone		2191	Pump	192				
Extensions											
Inman East	Gallatin	Palestine	Sandstone		1840	Pump	180				Also made 54 bbls. water.
Markham City	Jefferson	McCloskey	Lime		3064	Pump	513				
King	Jefferson	Levias & McCloskey	Lime			Pump	103				
Dix	Marion	Rosiclare	Sand		2101	Pump	90				
Mt. Erie	Wayne	McCloskey	Lime		3088	Pump	900				
Coil	Wayne	Aux Vases	Sand		2860	Pump	221				
INDIANA—New Fields											
	Posey	Cypress	Sand		2456–2465		185				
	Pike	Aux Vases	Sand		914– 919						Gas field; 700,000 cu. ft.
KANSAS—New Fields											
	Ellis	Gorham	Sand		3798–3805		320		36		
	Rooks	Arbuckle	Lime		3431–3456		3000		28		
	McPherson	Miss.	Chat.		2656–2668	Pump	3000				Three offsets dry.
	Russell	Kansas City-Lansing	Lime		2978–3002	Pump	430				
		Lower Pennsyl.			3807–3815						Gas field; 25,000,000, cu. ft. per day.
	Barton	Kansas City-Lansing	Lime		3040–3074	Flow	1200				One mi. north Beaver pool. Probable pot. 3,000 bbls.
KENTUCKY—New Fields											
	Henderson	Cypress	Sand		2303–2316		792				
	Union	Aux Vases	Sand		2611–2623		85				
SOUTH LOUISIANA—New Fields											
	St. Charles Parish				6536–6542		196	9/64	36.1		
Deer Island	Terrebonne Parish	Miocene	Sand	Miocene	9565–9570						Gas well, shut in. Rock pressure 4,000 lbs.
MICHIGAN—New Fields											
North Bangor	Van Buren	Traverse	Lime	Devonian	1017	Pump	119	None	28.3		
Aetna	Missaukee	Dundee	Dolomite	Devonian	3835–3842	Pump	262	None	40.1		
MONTANA—New Fields											
	Glacier	Madison	Lime		3899	Flow	96				
	Pondera	Sunburst			1725–1745	Pump	5		43		

New Oil and Gas Fields and New Pay Horizons Discovered in the United States in October *Continued*

FIELD	COUNTY	DISCOVERY WELL		Miles from Nearest Field	Miles from Pipe Line	Date Spudded	Date Completed	Total Depth (Feet)	Type of Structure	Method of Discovery
		Company and Well	Location							
NEW MEXICO—New Fields										
.....	San Juan	Cont. Oil's Navajo Ind. Res. 1	C NE SW 13-29n-19w			5– –42	10– –42	6950		Geophysical-subsurface
OKLAHOMA—New Fields										
.....	Pottawatomie	C. J. Bucy et al's Reed 1	NE NE SW 20-8n-4e				10– 6–42	4866		
.....	Seminole	J. E. Hall's Stockton 1	SE NE SE 2-6n-5e				10– 6–42	4528		
.....	Noble	E. J. Kubat et al's Tyer 1	NEc SW 7-21-3e				10–15–42	4355		
.....	Okfuskee	Mid-Cont. Pet. Corp.'s Reed 1	NWc SE 30-12-7e				10–22–42	4259½		
.....	Pontotoc	W. A. Delaney, Jr.'s Roper 1	CNW NW 26-5n-5e				10–26–42	2552		
.....	Carter	Lloyd Noble's Jolliff 1	NE NW NW 24-5s-1e				10–29–42	3232		
.....	Noble	Deep Rock Oil's Dailey 1	10-22-2e				10–31–42	4378		
New Pay Horizons										
Lucien	Noble	Danciger Ref.'s Plummer 1	CSE NE 5-20-2w, No. edge of field				10–14–42	5200		
Garr	Pawnee	Hall-Briscoe et al's Moebius 1	CSW NW 33-20-5e				10–15–42	3681		
Liberty	Noble	Sunray Oil's Schutz 1	CNW SE 9-22n-2e				10–22–42	4543		
EAST TEXAS—New Fields										
Larissa	Cherokee	Humble's H. F. Curtiss 1	John Vaughn Sur. No. 53			3–28–42	10– 1–42	10611		Geophysical
Chapel Hill	Smith	Sin.-Prairie's Swinney 1	Wm. Lockhart Sur. A-563				10–19–42	8336		
UPPER GULF COAST—New Fields										
Lake Creek	Montgomery	Superior Oil Co. of Calif.'s E. G. Frost 1	A. Hodge Sur. A-18			5–31–42	9–24–42	13293	Faulted	
LOWER GULF COAST—New Fields										
North Pettus	Bee	Union Prod. Co.'s G. A. Ray 58	R. C. Ballard Sur.	2	2	8– 3–42	9–24–42	7010	Deep seated—faulted	Subsurface-drilling
Sarco Creek	Goliad	Ginther, Warren & Ginther C. G. Wood 1	Domingo Morris Gr. A-25		3½	8– 9–42	10–29–42	5253	Faulted nosing	Subsurface-drilling
New Pay Horizons										
N. La Ward	Jackson	Magnolia's Gordon Est. No. 19	C. S. Woolfolk Colonial Land Co. Subdiv.				9–23–42	6504	Faulted	
NORTH TEXAS—New Fields										
.....	Archer	Perry Browning et al's Browning 1	L. P. Hunt Subdiv. German Emigration Sur.	1⅜	1⅜	7– 4–42	10–19–42	5330	Anticline	Subsurface and trend
.....	Clay	Fortex Oil Corp.'s Dallas Bank-Texaco 1	Jane Duncan's Sur. A-112	Nearby	Nearby	10– –42	10–20–42	1134½		Subsurface
Hildreth	Montague	Cont. Oil Co.'s Hildreth 1	E. T. Ry. Sur. A-250	1¾	5+		10–16–42	7256	Anticline	Geophysics
SOUTHWEST TEXAS—New Fields										
Cadena	Duval	Taylor Refg. Co.'s Cadena 1	Calletano Rios. Sur. 306	2 mi. SE Muralla		7–27–42	8–26–42	5800		Subsurface-drilling
WEST TEXAS—New Fields										
.....	Andrews	Mid-Cont. Pet. Corp.'s University-South 1	C NW NW Sec. 16 Blk 10, 2 mi. W of W. Fuhrman Pool	2	2	7–26–42	10–15–42	4599	Anticline	Geophysics
New Pay Horizons										
Embar	Andrews	Phillips Pet. Co.'s Univ.-Andrews 9	C NW NW Sec. 32, Blk. 10, 9/16-mi SE of pool's 7800′ Ellenburger discovery			6–14–42	10– –42	8174	Anticline	

New Oil and Gas Fields and New Pay Horizons Discovered in the United States in October *Continued*

FIELD	COUNTY	PRODUCING FORMATION			Depth of Pay (Feet)	INITIAL PRODUCTION			Gravity of Oil	Preliminary Estimate of Ultimate Production	REMARKS
		Name	Kind	Age		Method	24-Hr. Rate (Bbls.)	Choke (Inch)			
NEW MEXICO—New Fields											
.....	San Juan	LowerMagdalena	Sandy Lime	Pennsyl.	6900–6950						[2]Unusual gas well; see footnote.
OKLAHOMA—New Fields											
.....	Pottawatomie	Hunton	Lime		4456–4460	Pump	15				Also made 15 bbls. water.
.....	Seminole	Hunton	Lime		4143–4175		120	1/8	33		
.....	Noble	Mississippi	Lime		4024–4090		920				
.....	Okfuskee	Hunton	Lime		4250–4259½		5488				
.....	Pontotoc	Viola	Lime		2460–2552		7320				
.....	Carter	Springer	Sand		3220–3232		349		39		
.....	Noble	2nd Wilcox	Sand		4369–4378		1714		46		
New Pay Horizons											
Lucien	Noble	Misener	Sand		5200		240				Considerable gas flow.
Garr	Pawnee	Misener	Sand		3668–3681		125		41		
Liberty	Noble	Perry (Pennsylvanian)	Sand		2600–2610		50		36		Also made 50 bbls. water daily.
EAST TEXAS—New Fields											
Larissa	Cherokee	Pettit	Sandy-Lime	Lower Trinity	10160–10212	Flow	37	1/4	48	60,000 to 80,000 bbls.	Deepest production within Woodbine belt.
Chapel Hill	Smith	Travis Peak			8200–8280	Gas lift	44		42		Two mi. extension of field.
UPPER GULF COAST—New Fields											
Lake Creek	Montgomery	Wilcox	Sand	Eocene	11508–11533	Flow	160	22/64	46.5	25,000 to 50,000 bbls.	2½ mi. NE extension to Lake Creek; opens new sand in Wilcox.
LOWER GULF COAST—New Fields											
North Pettus	Bee	Wilcox	Sand	Eocene	6943–6963	Flow	37	18/64	61.3	10,000 to 15,000 bbls.	New distillate field.
Sarco Creek	Goliad	Frio	Sand	Eocene	4053–4069 & 4070–4086					Several trillion ft.	New gas field; may become one of largest gas fields in sw Tex.; 180,000,000 cfg. through open pipe.
New Pay Horizons											
N. La Ward	Jackson	Frio	Sand	Eocene	6250–6253	Flow	9	3/16	Dist.	5,000 to 7,000 bbls.	Old well deepened; produced gas-distillate, but important field foreseen.
NORTH TEXAS—New Fields											
.....	Archer	Ellenburger	Dolomite	Ordovician	5200–5330	Flow	585½	½	41.6	60,000 to 80,000 bbls.	Also made 46 bbls. salt water, based on 3-hr. test.
.....	Clay	Cisco Series	Sand	Pennsyl.	1103–1134½	Pump	25		40	20,000 to 30,000 bbls.	Small shallow pool; dry holes confine producing area; due to have more than one pay.
Hildreth	Montague	Basal Simpson	Sandy Lime	Ordovician	7160–7202	Flow	329	30/64	40	60,000 to 80,000 bbls.	Only 193,000 cu. ft. gas daily.
SOUTHWEST TEXAS—New Fields											
Cadena	Duval	Pettus	Sand	Eocene	5260	Pump	76		44.1	15,000 to 18,000 bbls.	Near a field with small reserve; tentatively cannot be credited with large reserve.
WEST TEXAS—New Fields											
.....	Andrews	San Andres	Limestone	Permian	4520–4599	Pump	95		32.1	40,000 to 60,000 bbls.	May be continuation of W. Fuhrman or W. Andrews pools.
New Pay Horizons											
Embar	Andrews	Clear Fork (Tubb)	Limestone	Permian	6210–6275	Flow	259	2	43.5	80,000 to 100,000 bbls.	This pay zone passed up by pool's Ellenburger discovery. Is on east brink of fast dipping lime structure. Better wells due from higher parts of structure, but 6200' pay may be small in area.

New Oil and Gas Fields and New Pay Horizons Discovered in the United States in October *Continued*

FIELD	COUNTY	DISCOVERY WELL: Company and Well	DISCOVERY WELL: Location	Miles from Nearest Field	Miles from Pipe Line	Date Spudded	Date Completed	Total Depth (Feet)	Type of Structure	Method of Discovery
WEST CENTRAL TEXAS—New Fields										
.....	Shackelford.....	J. W. Keys et al's A. Andrews 1	E. T. Ry. Sec. 14				10-12-42	583		
New Pay Horizons										
Wimberly.....	Jones.....	Fain-McGaha Oil Corp.'s W. L. Butler 1	L. B. Ramsey Sur. No. 39				10- 5-42	2200½	Anticline	
Reddin.....	Taylor.....	Butler-Horne Drlg. Co. et al's W. H. Frazier 1	T. & P. Sec. 26, Blk 17, 1110' W of pool discovery			9-11-42	10- 3-42	2444		
WYOMING—New Pay Horizons										
.....	Pilot Butte.....	British-American'sStock1	21-3n-1w				10-26-42	6750		

FIELD	COUNTY	PRODUCING FORMATION: Name	Kind	Age	Depth of Pay (Feet)	INITIAL PRODUCTION: Method	24-Hr. Rate (Bbls.)	Choke (Inch)	Gravity of Oil	Preliminary Estimate of Ultimate Production	REMARKS
WEST CENTRAL TEXAS—New Fields											
.....	Shackelford...	Cisco	Sand	Pennsyl.	579- 581	Pump	8				Half mi. S. of shallow production but cut off by failures.
New Pay Horizons											
Wimberly.....	Jones.....	Tannehill	Sand	Pennsyl.	2188-2200½	Flow	608	½	40	40,000 to 60,000 bbls.	Shallowest of numerous oil zones in pool; may be restricted to edge of structure and not cover much area.
Reddin.....	Taylor.....	Hope	Limestone	Pennsyl.	2442-2444	Flow	212	¾	40+	80,000 to 100,000 bbls.	Also made 10% water in 7 hrs; second and deeper pay for pool; more pays due slightly deeper.
WYOMING—New Pay Horizons											
.....	Pilot Butte...	Embar			6150-6210	Pump	103				80% water.

[1] September completions.
[2] This wildcat is 2 miles S by E of nearest of three 6700-6900 ft. oil producers (some abandoned now) completed by Conoco on Rattlesnake dome, and was estimated some 200 feet below projected pay level when high-pressure gas began showing through 9.2 lb. rotary mud. Well threatened to blow out, and some difficulty encountered in preventing blowout. U. S. Bureau of Mines analyzed gas and reported: 83% nitrogen; 9% ethane and methane; and 8% helium; also reported gas contains other properties considered valuable for making explosives and not present in any other gas wells. Due to its military value, U. S. Bureau of Mines arranged to take over well and cement pipe for try at completion, but in event oil is developed during the operation Conoco is to regain possession of well and assume cost of completion. Well is being listed as ungauged gasser until completion.

Wildcatting Results Fall Short Of Expected Required Drilling

RESULTS in wildcatting in the United States during October fell materially short of the development hoped for by the Office of Petroleum Co-ordinator in setting up a program of minimum necessary drilling for this year.

In recommending that the industry be assigned materials to drill at least 19,000 wells, OPC calculated that those wells should include 4000 wildcats, of which 624 should produce oil, 116 gas, and 3260 be unproductive. Those figures are equivalent to averages of 333 total wildcat completions per month, of which 52 should produce oil, 10 gas, and 272 be dry holes.

As against the 333 wildcat completions desired, there were in October only 235, as reported in the weekly completion lists in THE OIL WEEKLY.

As might be expected, that failure to achieve the desired volume of wildcatting resulted in fewer oil and gas field discoveries than hoped for. The month's discoveries, tabulated herewith, included instead of the desired 52 oil productive wells a total of 32 new oil field discoveries, 1 new distillate field, and 12 new pays in established fields. Instead of the 10 per month gas field discoveries aimed at, there were found in October 5 new gas fields.

(Latest available data on results for Illinois are for September, and in this survey, they are considered as October development.)

Over one half of the 32 new oil fields that were found were in Oklahoma, Kansas, and Illinois, where discoveries commonly are pools of limited area and importance. The three states furnished, respectively, 7, 5, and 5 new oil fields. Texas accounted for 7, and there were 2 in Kentucky, 1 in Indiana, 1 in South Louisiana, 2 in Michigan, 2 in Montana.

The 12 new oil pay horizon discoveries included 3 each in Illinois and Oklahoma, 5 in Texas, and 1 in Wyoming. The new distillate field was on the Lower Texas Gulf Coast, and the 5 new gas fields found included 1 each in Indiana, Kansas, South Louisiana, New Mexico, and lower Gulf Coast of Texas.

It probably is unpleasantly significant that remarkably few of the new discoveries were in districts commonly thought of as having possibilities for the more important fields, such as West Texas, the Texas-Louisiana Gulf Coast, East Texas, North Louisiana, Arkansas. California furnished no discovery during the month, and in fact has had only 1 new oil field brought in this whole year.

Roundup

[Continued from page 11]

"There is so great a demand for raw materials by all industries that it is absolutely essential that the oil industry use the materials it requires with maximum efficiency," Deputy Coordinator Davies explained in announcing the inventory.

"The nation's supply of oil country tubular goods must be used sparingly and only for essential, authorized programs. Thus, it is necessary that idle or surplus stocks be made available to all operators and, at the same time, that the materials be distributed only for approved operations.

"The present inventory will make it possible to utilize the oil country tubular goods for the most effective purposes."

☆

MAINTENANCE: Continued operation of refineries and oil and gas lines was assured by the War Production Board November 11 in an order authorizing operators of such facilities to apply the top priority rating of AA-1 to materials for essential repair and maintenance. Announcing that the priority system would be continued for this purpose until the controlled materials plan goes into full operation, the board specifically listed oil industry facilities among those entitled to the rating, designed to keep essential industries and services going.

☆

PRICES: A ceiling price of 74 cents per barrel for No. 6 fuel oil for all Texas Panhandle refineries was established November 12 by the Office of Price Administration, to bring into line the maximum prices of two refineries in the area which had a 69-cent ceiling during the base period last year while more than 75 percent of the volume of No. 6 fuel in the area had a ceiling of 74 cents.

The order will become effective November 17 and will apply to bulk shipments in tank cars and tank transport to destinations in Texas, Oklahoma and New Mexico. Railroads are the principal consumers of Panhandle No. 6 fuel oil, it was said.

Drilling Contractors to Hold Annual Meeting

Problems of vital importance in the drilling industry will be discussed at open sessions when the American Association of Oilwell Drilling Contractors holds its second annual meeting at Tulsa on Thursday and Friday, November 19 and 20.

On Thursday morning there will be meetings of all committees, including those on labor relations, wages and hours, transportation, drilling equipment, accounting, priorities, insurance, taxes, compensation, drilling practices, safety engineering, public relations and policy, and cable tools. The committees will make reports that afternoon in open session, after which is scheduled a paper on rationing and oil field transportation by a speaker from the Office of Defense Transportation. At a banquet Thursday evening, Elmo Thompson, Superior Oil Corporation, will be toastmaster, and there will be a discussion of priorities by a representative of the OPC.

After an address by J. E. Brantly, Drilling & Exploration Company, Inc., on Friday morning, there will be a paper on wages and hours by Gus C. Street, Jr., regional director, Wage-Hour Division, U. S. Department of Labor, and one on "Cooperation Among Drilling Contractors," by Howard P. Holmes, president of Two States Drilling Company.

After luncheon and installation of officers Friday at noon, there will be an address by Hon. Wesley E. Disney, congressman from the Tulsa district. He will be followed on the program by J. S. Montgomery, general superintendent, northern region, Phillips Petroleum Company, who will talk on "Making the Most of What We Have." "Manpower and Selective Service," will be the subject of a discussion by Major I. O. Hogan, C. W. S., occupational deferment officer for Oklahoma state headquarters of Selective Service. Also scheduled for the Friday afternon session is an address by D. R. Knowlton, director of production, Office of Petroleum Coordinator, Washington, who will speak on "The Drilling Contractor Under the Controlled Materials Plan." The government now is working on a materials distribution plan which will be adjusted to give necessary equipment to projects approved as necessary to the war effort.

Adjustment to Gasoline Rationing Not Adequate

There was only partial success during the week ended November 7 in adjusting refinery operations to the radically changed requirements imposed by scheduled nationwide rationing of gasoline. Production of gasoline was reduced by 37,000 barrels daily from the previous week's rate, with the result that output conformed very closely with current consumption, as evidenced by the fact only 11,000 barrels a day accumulated in storage.

However, that reduction in gasoline production was achieved in considerable part by curbing crude runs to refinery stills, rather than by the recommended lowering af gasoline yields. Daily average crude runs to stills were down by 57,000 barrels from the previous week's rate.

There was achieved an increased refinery yield of urgently needed heating oil, as indicated by the fact that stocks of gas oil and distillate fuel were increased in the satisfactory amount of 903,000 barrels within the 7 days, compared with a build-up of 763,000 barrels the previous week and an increase of about 650,000 barrels in the week ended November 8, 1941. Nevertheless, stocks of the light fuel oils are 7,000,000 barrels or 13 percent smaller now than a year ago, in totaling 49,034,000 barrels (as of November 7).

Less favorable results occurred in the week of November 7 in connection with heavy fuel oils. Stocks of those fuels were further depleted by 849,000 barrels and then were 16,500,000 barrels (17.4 percent) smaller than a year previously in totaling 78,317,000 barrels. All districts of the country are seriously low on inventories of those oils.

Crude runs to stills for the whole United States averaged 3,674,000 barrels daily in the week ended November 7, down 57,000 from the week before, and 321,000 barrels under the daily average runs of 3,995,000 barrels in the corresponding week last year. The nation's refining equipment was being operated at 76.5 percent of capacity. In OPC Districts 1 and 3, Southwest and East Coast areas, plants charged to stills 1,631,000 barrels of crude daily and used 67 percent of capacity. In the Appalachian, Middle Western, and upper Mid-Continent districts, plants utilized 88 to 90 percent of rated capacity, and in California 87 percent, while the Rocky Mountain states used 60 percent. Only the Oklahoma-Kansas runs were higher than in the previous week.

Production of gasoline, similarly, was lower than in the preceding week in all districts except Oklahoma-Kansas. And all districts showed withdrawals of gasoline from storage except the combined East Coast-Southwest districts, now grouped in published statistics. Presumably, the 675,000 barrel piling up of gasoline in the combined districts occurred principally on the Gulf Coast, considering the use of transportation to the East in present large measure for moving fuel oils.

United States stocks of finished and unfinished gasoline totaled 79,238,000 barrels on November 7, up 79,000 from a week earlier but 3,227,000 barrels (4 percent) under the 82,465,000 barrels on hand November 8 last year.

The 704,000 addition to stocks of gas oil and distillate fuel in the week ended November 7 likely occurred mainly in the East Coast district, where needed, as that area and the supplying Southwest together showed a 645,000 barrel increase. There were withdrawals in the Appalachian and Middle Western districts, but Oklahoma-Kansas-Missouri added 101,000 barrels. Rocky Mountain states were virtually unchanged, and California added 37,000.

The week's draft on heavy fuel stocks occurred chiefly in the combined East Coast - Southwest districts, but there were withdrawals also in the Appalachian, Middle Western, and California districts. Only Oklahoma-Kansas-Missouri and the Rocky Mountain districts added to storage.

United States production of crude oil averaged 3,838,000 barrels daily in the week ended November 7, the American Petroleum Institute reported. The output was 63,000 barrels a day lower than in the previous week and 258,000 barrels (6.2 percent) under the 4,096,000-barrel daily average of the week ended November 8, 1941.

Crude oil stocks in the United States previously had been steadily declining, but they increased 1,280,000 barrels to a total of 239,266,000 in the week ended October 31, the Bureau of Mines reported. Nevertheless, the crude inventory of the nation is 4,000,000 barrels (1.6 percent) smaller than a year ago and within 10,000,000 barrels of the lowest point of the past 20 years, reached in October, 1939.

PRACTICAL OPERATING *Hints* FOR

1. WELDING

Cable-Carrying Wells Speed Truck Handling

Built-in carriers form corners of extended truck bumper and, provided with hinged tops, keep welding leads handy, dry and secure from damage by other maintenance equipment.

AS A MEANS of transporting and protecting wire cables used with an arc welder, wells may be built onto the rear of the truck into which the cables may be coiled.

The storage wells are made integral with the frame of the truck bed, one being located at each corner, with the rim elevated sufficiently to prevent drainage of oil or water from truck bed into well.

Steel of proper gauge is formed into a tight-bottomed cylinder over which is fitted a hinged cover, opening back against the accessory boxes alongside the generating unit, with the interior carefully formed to avoid projections or angles which might damage or kink the cables.

The lower edge of the well wall is fitted with an inclined louvre opening toward the rear of the truck, permitting drainage without admitting mud or dirt stirred up by truck operation. Cable covered with road or field dirt and oil may be coiled down in the wells and washed off in place with a hose, water and dirt draining off through the louvre and leaving the cable clean.

Locks may be fitted to carrier units as precaution against possible pilferage of hard-to-get copper leads.

THE practical operating hints for the drilling rig, production man and pipeliner, appearing regularly in these pages, are secured from oil operations everywhere and offer suggestions that will help to improve operating efficiency and safety.

The items give an excellent picture of the remarkable ingenuity being exercised by the operating divisions of the industry. Contributions to these features will be paid for at the rate of $5 for each illustrated item accepted. Address contributions to "The Editor, The Oil Weekly, Houston."

2. GAS PRESSURE ALARM

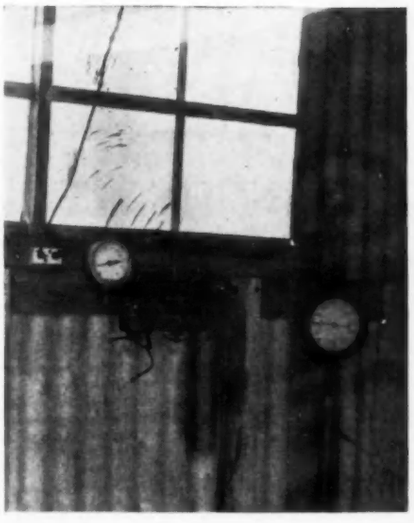
Protecting System Against Losses

SOMETIMES, when a lease will hardly furnish enough gas to run its engines, extra gas must be purchased and often this purchased gas is fed right into the lease gas system so that as much as the lease gas as possible can be used along with the purchased gas. When this is the case, it is desirable to keep the gas pressure down to the minimum pressure necessary to operate the engines, so that gas will not be lost into the formations or through leakage. One company rigged up the apparatus shown in the picture to give an alarm when the gas pressure got above 1½ lbs., so that the pumper could shut down the purchased gas.

A junked regulator was tied into the gas line and a low pressure gauge attached so the pressure on the line would be visible at all times. A hole was cut in the top casting of the regulator, exposing the top of the diaphragm to atmospheric pressure at all times. The metal plate on top of the diaphragm was attached to the body of the regulator by a flexible copper wire to assure good electrical contact.

A sharp pointed thumb—or set—screw was attached to the top of the regulator, but insulated from it and the screw adjusted so that the metal plate on top of the diaphragm would be in contract with it when the diaphragm was raised. The grounded wire of a regular 110-volt circuit was attached to the body of the regulator and then a wire run from the thumb-screw to one terminal of an electric bell.

The other terminal of the bell was attached to the ungrounded side of the circuit so that the regulator would act as an automatic switch. By means of the spring that is on top of the regulator and the screw for applying pressure to this spring, the regulator was adjusted so that at all pressures below 1½ lbs., the diaphragm was down against the bottom and when the pressure reached 1½ lbs., the diaphragm would rise and the metal plate would contact the sharp-pointed thumb-screw and close the circuit, ringing the bell. The thumb-screw can be raised or lowered so that it will contact the plate on the diaphragm at the right time. This has proven to be a never-failing signal.



Diaphragm, open to air pressure above, carries electrical contacts signalling change in pressures.

THE PRODUCTION MAN

3. PULL ROD SUPPORTS

Extended Guides Carry Spans Successfully

WHERE IT IS necessary that pull rod strings cross deep ravines, the rod line stakes are somtimes, of necessity, quite a little higher than a man's head, and if a line breaks, the string jumps off the pull-rod carriers and falls to the ground. When this happens, it requires several men to repair the break, as the rod line must be lifted back in place—sometimes quite a job.

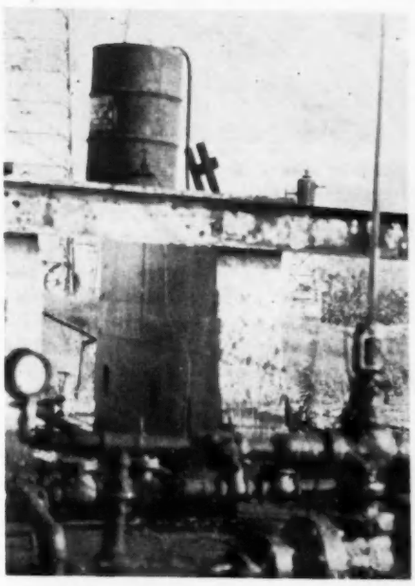
One company bent short pieces of old sucker rod in 90-degree ells and welded them to the tops of the rod line stakes, as shown. If the rod line breaks now, the line is help up by the forks of sucker rod, and does not fall. One man with a long pole now can lift the line back on the carriers and thus save time and money.

A bad feature of the high rod-line stakes was that they would vibrate or chatter as the wells were pumped and eventually loosen the stakes at the base. This was solved by cutting holes through each stake about a foot from the top and threading an old piece of sand line through the holes. One end was fastened to a deadman in the ground and the other end was tied the same way except that a turnbuckle was used so that the line could be tightened. After tightening the line, small wire line clamps were put at each side of the stakes and the chattering was eliminated. Both ideas have proven very successful.

Welded arms prevent jumping of rods from carriers in case of break, and simplify replacing.

4. ROD LUBRICATOR

Drum and Line Provide Water Flow to Packing



Gravity feed through pinch-cock provides controlled lubrication of polished rod stuffing box.

WHEN IT IS necessary to screw up the packing gland on a pumping well to prevent escape of fluid around the polish rod, water has been found to have admirable lubricating qualities as well as the ability to prevent excessive heating with attendant scoring of the polish rod.

A common oil drum is located at a convenient height above the packing gland, and may be set on one of the concrete foundation piers left at the well after completion. Piping, either copper tubing or common small diameter line pipe connects the drum with the stuffing box and packing gland.

A pinch cock in the line provides control of the quantity of water, which may be reduced in amount to an occasional drop, or just enough to fill the depression around the polish rod when the sucker rods are at the bottom of the stroke.

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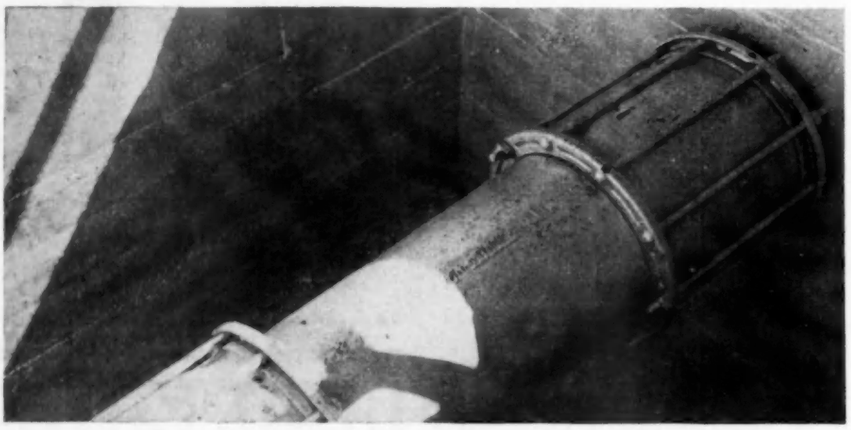
PRACTICAL OPERATING *Hints* FOR

1. EXPANSION JOINTS

Pit Provides Access To Line Equalizers



Where pipe line traverses ravine and shifting is possible, sleeve joints and short spool permit length regulation without extensive uncovering or ditching job.

ON A HIGH pressure gas transmission system which crosses a salt flat where corrosion is particularly severe, parallel lines were laid so that if one part failed the other would continue in service when the necessary manifold gates were opened. Both pipe lines dip sharply on either side of the depression which causes some expansion and contraction, as well as creep of the pipe.

Compensation for creep was included by installing two pipe-line couplings separated by a short pipe nipple. Since some difficulty might be expected, concrete pits were made so that inspection and maintenance of the sleeves could be accomplished without sending a maintenance crew into the field to strip that portion of the line to uncover the double setting of pipe-line connections.

Anywhere!

Buckeye Trenchers minimize right-of-way work. Dig in any soil. Ruggedly constructed. Faster. Readily maneuvered. Model 12 (shown) for gathering, gasoline and small natural gas lines. Models 32 or 48 for main lines. The standard trenchers for pipeline work.

BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio
Built by Buckeye
TRENCHERS. SHOVELS. CRANES
BACKFILLERS. TRACTOR EQUIPMENT.

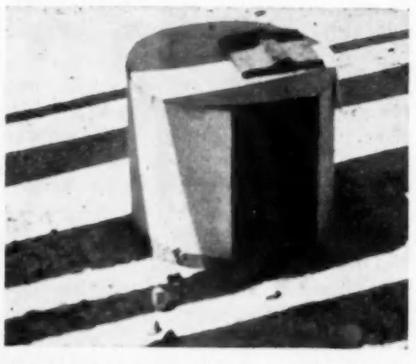
2. THERMOMETERS

Cover Aids Visibility And Protects Low Unit

WHEN it is necessary to obtain temperatures with an indicating thermometer which is placed in a pipe line buried in a shallow ditch near other equipment of a transmission system the instrument should be protected from breakage. A convenient and cheaply made cover can be constructed by using a sheet of thin metal long enough to form an adequate housing over the thermometer.

A section cut from a 5-gallon oil can can be made to serve for this purpose. Both ends are left open and an opening as an inspection door is cut in one side, while a light movable cover protects the top of the installation from falling objects.

Additional weight may be necessary to prevent the light cover from blowing away, and any convenient piece of heavy material can be used, such as any discarded equipment, or, if this kind of material has all been salvaged, a stone will serve the purpose.



Painted can set over instrument gives target sufficient to insure sidestepping.

3. WASTE CONTAINER

Salvage and Protection Assured by Neat Unit

Cover attached by short chain insures protection of waste and rags collected in drum.

WASTE barrels are essential when rags are used for wiping machinery and pipe-line pumps, both as a fire prevention means and to aid plant cleanliness.

Covers for such waste barrels seem to have a habit of becoming misplaced, resulting in the barrel of rags and wiping cloths being fouled with sand and dirt. This extra foreign matter adds to the expense of cleaning, especially when the dirty rags are weighed out to the launderer "in the rough," instead of being paid for on the basis of clean rags returned.

Uncovered barrels form a serious haz-

ard which may be avoided if covers be attached to the containers with short sections of chain, welded to the container and to one edge of the lid, with slack enough to permit the lid to be positioned over the drum.

4. GATE LOCK

Blanked Pipe Cover Prevents Tampering

Hood with locking bar and padlock enables line to be secured in open or closed position.

THEFT from pipe-line drips can be prevented when the gate on the vent line is equipped with adequate locking facilities, an example of which is illustrated by a cap placed over the entire gate. A short piece of pipe sufficiently large in diameter to slip readily over the wheel and body of the valve is used after a section is cut away on each side leaving fingers which extend downward beside the body of the valve.

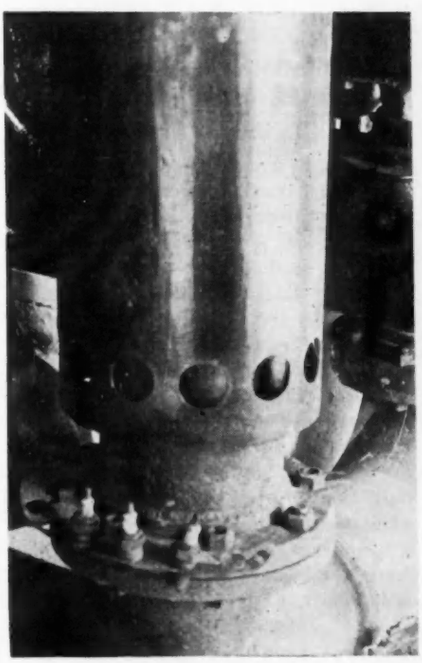
Sufficient length is allowed for these fingers below the gate body so that elongated holes cut through the metal will permit a bar to be passed through both holes under the gate body. One end of the bar has a head attached which prevents passing entirely through the elongated holes while the other end is equipped with a round hole for the use of a heavy duty lock operable only by employes possessing a key.

5. IGNITION

Spark Plug Drier for Quicker Engine Starts

SPARK PLUGS which have become saturated with moisture, or which tend to collect condensation in a cold engine, may be dried and kept in condition for effective replacement if they be stored in a drier and rack.

A segment of sheet metal is cut to fit around part of the flange of a joint in the exhaust pipe, and holes cut through the segment of the proper size to allow the threaded portion of the type spark plug used to protrude. By having one of these racks on each engine exhaust, it is possible to place damp or cold plugs in the hot air current flowing around an active exhaust.



Utilizing exhaust heat with rack for units permits drying of fouled or drowned plugs.

CUT AND BEVEL YOUR PIPE IN 12 MINUTES OR LESS with the ALSTON RATCHET PIPE CUTTER and BEVELING TOOL

The patented Ratchet Pipe Cutter and Beveling Tool is a sturdy, powerful, easy-to-operate pipe cutter that has been fully tested in the field. Ratchet principle enables operators to work in close places. Bevel tool removes bead on pipe and automatically conditions pipe for welding, threading or sleeving. Cutter may be slipped on or off by simple operation of one pin.

Write for full details on this superior, money saving pipe cutter.

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WATER • PIPE LINES
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HOUSTON, TEXAS

A Year of M-68

[*Continued from page 20*]

man power of the nation. The 1-A wells and production facilities — those from which materials can be made readily available — will include presently idle wells, high water-oil-ratio wells, high gas-oil-ratio wells, closely spaced wells, and other production facilities that may be dispensed with without injuring ultimate recovery. Wells in the 1-B classification will include those borderline cases—wells that are presently being produced profitably but which may be looked to as a source of materials and equipment if the materials shortage continues to be critical and the war is prolonged. Obviously, in such a classification, we reach a type of well that is the backbone of the nation's oil production. It is that type of well for which we will need repair and maintenance materials, in order that its productive capacity may be unimpaired.

There is one other thing—we hear so much about the need for exploratory drilling that I wonder if improved production methods such as pressure maintenance and gas and water repressuring are receiving the attention they merit. A temporary subcommittee on secondary recovery for Oklahoma has compiled a report showing that half a billion additional barrels of oil are available in that state through secondary recovery. It takes a lot of wildcat drilling to uncover a reserve of that quantity.

Pipe Lines and War Demands

[*Continued from page 24*]

not been sufficiently high to procure the required materials on schedule. All lines have been designed with the minimum of critical materials. Shortage of material has meant that we have had to comb the industry for second-hand equipment, including pipe, pumps, and tankage.

New proposals, new studies, and new recommendations are being made all the time. Many new projects are now under consideration and details are being worked out to expedite completion. Outstanding among these are the numerous rearrangements necessary to provide an adequate supply of crude oil and heating oil for the 24-inch line.

I should like to point out that none of these projects could have become actualities without the closest cooperation between the oil industry and many departments of the federal government.

Aside from physical construction, in pursuing our main objective to substitute fully overland transportation for tank ships, the joint program of government and industry has involved three major elements: (1) increasing the efficiency of existing transportation facilities; (2) evaluating the relative efficiency of substitute methods of transportation in terms of steel and power requirements; and (3) actually securing the critical materials necessary for expansion of facilities.

Our goal is to deliver overland approximately 1,400,000 barrels daily of petroleum to the East Coast, both for essential domestic supply and off-shore demands. Thus far we have been able to increase this overland movement from some 50,000 barrels daily in peacetime to in excess of 1,000,000 barrels per day. To accomplish our objective we have yet to gain 400,000 barrels daily overland. The only answer, in our judgment, can be the building of more pipe lines.

Pipe Lines as Well As Oil Needed

[*Continued from page 27*]

ducing and marketing 20,000 barrels a day less than in December, and West Texas 100,000 barrels a day less. A part of the present unused pipe line capacity is in lines leading to Corpus Christi, but the major proportion is in lines to refining districts of the upper Gulf Coast. Furthermore, the West Texas-Corpus Christi lines run close to San Antonio, and by laying comparatively short sections of pipe from there to the Luling district east of San Antonio, they could be made to feed into systems leading to Houston and Port Arthur-Beaumont.

New Mexico and West Texas fields also feed crude into several trunk pipe lines leading into Central Texas and North Texas, and those lines afford possibilities for increased outlet for the fields to be routed toward the Middle West and the East via either East Texas or Oklahoma. The principal work to be done would be installation of pumping stations and some relaying of pipe from lines with any excess capacity. These potentially enlarged outlets for West Texas and New Mexico and for any newer fields of Central or North Texas would fit especially into any necessary rearrangement of pipe line facilities to compensate for decreases in producing ability of Oklahoma and Illinois. Possibly forerunners of similar readjustments, therefore, were the projects under which Texas Pipe Line Company looped its system between Dallas and Stuart, Oklahoma, with 110 miles of 10¾- and 8⅝-inch line, while Stanolind Pipe Line Company laid 54 miles of 12-inch line in looping its system between Graford, Texas, west of Fort Worth, and Healdton, Oklahoma, those two projects having provided over 40,000 barrels daily of capacity from Texas to Illinois.

Apparently, it would be possible even in the immediate future, largely by using present established pipe line systems, to draw on West Texas crude reserves at rates well above 100,000 barrels daily in excess of current production.

Nevertheless, as in the case of fields of the Corpus Christi district, those of West Texas and New Mexico cannot be fully utilized, if and when it becomes necessary to draw on them materially above present rates of production, unless there is considerable enlargement of pipe line facilities, including building of extensions to some of the newer fields as well as expansion of the trunk lines.

Aside from scheduled reversals of flow in crude lines to permit movement of Texas Gulf Coast crudes to East Texas, there is near completion an improvised northward shipping products line, which will deliver products from Port Arthur via Shreveport, Louisiana, and El Dorado, Arkansas, to Helena, Arkansas, on the Mississippi river, for barging thence to Pittsburgh. The line will deliver 55,000 barrels daily at Helena, and all that amount represents potential new market outlet for fields of the Gulf Coast which may be called upon for increased production henceforth. The system was provided by reversing a gasoline line from Shreveport to Port Arthur (Texas Pipe Line Company system that formerly was leased to Cities Service for southward movement), by connecting that line with others leading to El Dorado, and by building from El Dorado to Helena a 158-mile products line of 10¾-inch pipe reclaimed from the Gulf-Magnolia crude line from the Texas Panhandle to Ranger, Texas.

Still more pipe line capacity for ultimately drawing on rich Louisiana-Texas Gulf Coast fields will be that afforded by the Plantation Pipe Line Company products line upon completion soon of the extension of that system to Beaumont and Houston. About 60,000 barrels daily outlet for refined products will be provided by the 80 miles of 8-inch and 212 miles of 10¾-inch line from Texas to the connection with the Plantation system. This outlet will be possible by increasing Plantation's Baton Rouge-Greensboro, North Carolina, carrying capacity through installation of 14 intermediate pumping stations and through extension of the Plantation line from Greensboro to Richmond, Virginia, with 165 miles of second-hand 8-inch pipe. All this expansion of the Plantation system is due for completion around the end of the year.

The Week's News

Final Evidence Due On Salt Water Plan

The Texas Railroad Commission statewide hearing set for November 19, will be one of the most significant that has taken place for several years. The outstanding feature of the hearing will be the presentation of final evidence upon which the commission will base an order to effect reduction of salt water production in the East Texas oil field.

During the past few months the Petroleum Coordinator has exerted much influence on the commission, concentrating primarily on the promotion of orders intended to aid in the conservation of gas in various Texas oil fields. Never before, however, has the commission been handed an ultimatum: shut off East Texas salt water or the field will be taken over by federal authorities.

The Zeppa salt water control plan, as modified, was the brain child of the federal officials. Some members of this group favored more extreme action. It was proposed that they take over the entire field, unitize it, and allow production from only one well on each 10 acre unit. Subsidies for operators whose wells are to be closed in was contained in another proposal.

As the plan stands now, allowable transfers rather than cash subsidies will be used. Wells producing more than 100 barrels of salt water daily are to be typed on the basis of their probably productive life. Different decline curves for the various types will be devised and applied uniformly. Thus some wells will be given a producing life of 12 months, others 18 months, and others two years, perhaps.

Having typed the well, it will be closed in and its allowable produced from some other well better situated on the structure, from the standpoint of salt water production. No oil will be assigned to any well producing more than 25 percent salt water, nor will more than six barrels of extra oil be assigned to any one well.

There are many legal questions involved in the plan, especially as it affects the rights of royalty owners, but it was apparent at the hearing held in Austin on October 29, that these would be brushed aside in the face of the more serious threat of federal control. The primary consideration seemed to center around the derivation of the most equitable plan for closing in the water wells.

East Texas is the largest field so far which has been invaded by federal officials on such a scale. While many operators are opposed to the program, most of them have concluded that because of the war, it is unwise for them to voice their opposition publicly. They realize that they are in the same position as the tire or automobile dealer whose business was eliminated by the action of a federal board.

Commissioner Jester says that there are many other possible methods of controlling salt water other than those embodied in the Zeppa plan. He has made a study of these and will probably present them during the course of the hearing Thursday.

It seems likely that the railroad commission will act soon after the hearing to install an order. Should it become effective by December 1, then the salt water should be controlled sufficiently to enable the production of the additional oil needed to fill the "big inch" pipe line by the time it is completed.

Court Decision Affects Rail Commission's Orders

The Texas Supreme Court has held that members of the railroad commission must all have an opportunity to confer on new orders before they are issued. The ruling was contained in each of two decisions handed down last week involving truck permits.

The evidence indicated that in each case two of the commissioners had acted on an order and issued it without the knowledge of the third.

It appeared from the court opinion that each commissioner must be notified when an order is up for consideration, and be given an opportunity to confer with his colleagues before it is signed.

In the past it has been customary for examiners to prepare an order and present it to each commissioner separately in most cases. This practice was followed especially on minor orders, although conferences were usually held on such questions as the statewide oil orders. In some instances, however, even these were passed by two of the commissioners, without allowing the third one to know what was being issued.

The court held that such orders were void but because proof must be offered in each case; no orders were actually voided by the decision, save those two which had been brought up in the suit.

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Uniform Method Sought For Measuring Tanks

Plans to revise the Texas Railroad Commission's orders governing the measurement of oil in tanks, cleaning of tanks, and processing of tank bottoms, were offered at a hearing last week. The principal difficulty discussed was the difference in measurement now used by the various operators.

Some companies measure the oil in the tank and include all tank bottoms; others estimate the amount of tank bottoms and deduct this amount from their calculations. The commission sought an order which would result in a uniform operation.

Another phase discussed was the order of the commission requiring a permit before a treating plant may be built, and an inspection by the commission before it is permitted to operate. This has caused considerable delay in the construction of some plants and a revision of the orders was proposed to eliminate this delay.

It was also developed that now many companies burn waste oil and wax which constitutes tank bottoms to prevent the waste from being charged back against allowables. W. J. Murray, Jr., representing the petroleum coordinator, appeared at the hearing and urged the commission to enter an order which would encourage the salvage of the wax.

Murray pointed out that the wax was important to military needs and was now being produced in insufficient quantities.

F. F. Murray Elected Head Of Equipment Supply Group

Meeting at the Palmer House, Chicago, incidental to attendance of many of its members at the annual meeting of the American Petroleum Institute, the Petroleum Equipment Suppliers Association elected officers to serve for the 1943 calendar year.

Officers elected were: President, F. F. Murray, Oilwell Supply Company, Dallas; vice president, F. J. Spang, Spang Company, Butler, Pennsylvania; secretary, Wharton Weems, Vinson, Elkins, Weems and Francis, Houston.

Murray, newly elected president, served the association as vice president last year.

Stripper Wells Group Starts Nationwide Survey

The National Stripper Well Association, working through the Interstate Oil Compact Commission, has requested a nation-wide survey of stripper wells. Operators of pumping wells are being asked for information concerning tax rates, reserves of oil, abandonments, prices paid for oil and other informative data, to be presented to the Office of Price Administration early in December. Purpose of the movement is for an increase in market price for crude oil produced from stripper wells.

API Standardization Work Aids War Effort

In the late 20's when J. Edgar Pew was putting in those telling blows in behalf of standardization of oil-field equipment, it is unlikely that he ever considered that completed specifications ever would be going off to war along with gasoline and oil. If this was not in his considerations, the popular vice president of Sun Oil Company can add another item to his scrap book or notch away in memory this additional use of the specifications, which he sought so long and helped to bring into reality.

At first it drew little attention when a request for certain specifications came to the office of C. A. Young, secretary of the API Division of Production in Dallas, from some branch of the military and they were handled in somewhat routine fashion. Then it came to be known that a tank being constructed in the Far East, the Near East or at home, if being done for the Navy, carried the cryptic line that the work must meet API specifications. So this standard, all worked out so the cost tankage could be reduced, came to have a place in the prosecution of the war.

Neither are tank standards the only specifications to be used by the fighting forces. And in addition, the accomplishments achieved through standardization of specifications have become more important than ever to the industry itself, since they represent savings in steel requirements in many instances.

This is not to imply that standardization of oil country equipment is finished. When a task is finished, it is dead. Development, improvement and changes in manufacturing methods and in methods of producing oil are not dead, consequently revision of specifications is a live subject.

Even though equipment is difficult to purchase, standards must be revised to changed economic and operating conditions. When specifications were brought up to the 1941 standard, it seemed like the type pages could stand as they were for a spell. Soon the committees were back at work at redoubled speed. It had become necessary to divert steel to military use, so derrick standards, for example, had to be revised in the light of oil field needs as well as battle field needs. Again the industry turned to wood tanks and considered concrete tanks. This time the changes could be considered under the guidance of the leading men of the industry. Likewise pumping equipment specifications were changed with steel saving the primary objective.

So many men had parts in the standardization program that a listing would be impossible. J. Edgar Pew was singled out simply because he is recognized as its leading exponent. Even when he was president of the Institute, he found time to continue as chairman of the Division of Production's committee on standardization.

Louisiana Permits

The minerals division of the State Department of Conservation last week issued 17 drilling permits as follows:

South Louisiana: Assumption Parish 1, Cameron Parish 1, Evangeline Parish 1, Plaquemines Parish 1, St. Landry Parish 1, St. Martin Parish 1.

North Louisiana: Bossier Parish 2, Caldwell Parish 1, Caddo Parish 2, Claiborne Parish 4, LaSalle Parish 2.

Lone Star Starts Work On 37-Mile Loop Line

Lone Star Gas Company is starting work on the installation of a 37-mile 18-inch coupled loop on the north end of its 20-inch natural gas trunk line between the Cayuga field and Irving Junction, between Dallas and Fort Worth. B. and M. Construction Corporation, Oklahoma City, will lay the line, using pipe salvaged from a portion of Lone Star Gas Company's system in the Ranger district. The loop is to be in service by December 15, and will increase deliveries of East Texas gas into the Dallas-Fort Worth territory by 36,000,000 feet daily.

Facilities for the delivery of gas from the Long Lake field to Waco and points beyond have been increased by Lone Star Gas Company an additional 20,000,000 ft. daily through the installation of a 31-mile 12-inch loop, extending east from Groesbeck towards the field and parallel to a 12-inch carrier.

Stanolind Acquires Line System at Dyersdale

Stanolind Pipe Line Company has augmented its Gulf Coast crude runs through the acquisition of Gulf Refining Company's gathering system that serves 22 leases in the Dyersdale field and 1500 barrels daily allowable.

Stanolind built a 4-mile 3-inch discharge line to connect the area with its trunk line between Houston and Aldine.

Stanolind to Build Short Line in North Texas

Pipe has been delivered to Stanolind Pipe Line Company for the construction of 54.2 miles of 12-inch loops in North Texas to increase its facilities for delivering sweet oil from the Gulf Coast and East Texas field from 22,000 to 38,000 barrels daily to East Chicago and intermediate middlewestern refineries of Standard of Indiana.

Jones & Brooks, Oklahoma City, will begin work November 16 on the loops, involving 26.6 miles north from Graford Station to Bowie and 27.6 miles between Bowie and Nocona junction, where connection will be made with its 8-inch system.

The new loops will parallel an 8-inch line that has been operating at maximum capacity for more than a year in handling sweet crude and also an 8-inch devoted to sour crude relayed from West Texas. Loops are to be completed within 30 days.

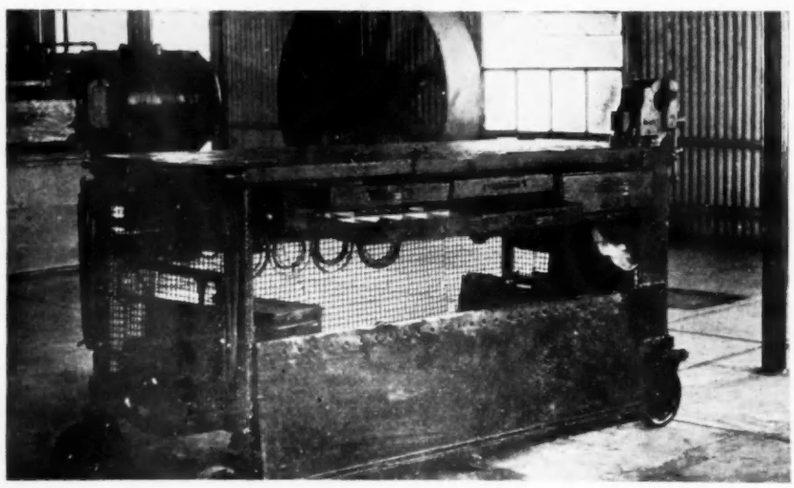
Drilling Permits

Permits for drilling 59 wells in Texas were authorized last week by the Texas Railroad Commission, a decline of 25 as compared with the week before.

There were 22 locations approved in Southwest Texas, two in the Gulf Coast, nine in West Central Texas, 10 in West Texas, 11 in North Texas and five in the Panhandle.

No permits received commission approval in the East Texas area.

MAINTENANCE HINT



Work Bench for Tool Protection

WHEN special tools are to be kept in prime condition a work bench that can be closed and locked prevents unauthorized use. A bench on a set of large casters permits moving to any point where maintenance is done, swivel bearings enabling short turns to be made. A shelf near the lower end of the legs is inserted for placing heavier parts, while a set of shallow drawers with convenient pulls set just below the work table cares for precision instruments and fine wrenches. One side and both ends are enclosed with welded-on hardware cloth and the remaining side has a hinged wall, which drops almost to the floor when opened, but which can be raised to cover the entire side and drawers when closed. Locking is with end hasps, staples and padlocks.

Gasoline Demand Brisk as Widened Rationing Nears

Markets currently are featured by extreme scarcity of heavy fuel oils, as some use of those oils for heating adds to difficulty of supplying the principal consumption for industrial purposes. On the Atlantic seaboard, suppliers are operating with only a few days' supply, and in the Middle West, marketers report extreme shortages and no prospect of relief. Gulf Coast refiners directly feel the scarcities of the heavy fuels in the East and Mid-West, as purchases are made from them to alleviate the desperate needs; while Mid-Continent refineries report continued tight situation on the fuel oils.

Somewhat less tight generally is the market for heating oil, while the outlook is brightened a little by the special measures now being taken or planned for increased movements from the Southwest to the East, including the program of allocating space in the 24-inch pipe line for movement of heating oil when the line goes into operation around January 1. Nevertheless, no great optimism is justified on prospects of being able to meet the requirements of the burning oils. While needs currently are being well supplied, it is recognized that cold weather would sharply increase demand and perhaps bring shortly an unusually tight market. Only a mild winter would assure avoidance of trouble in meeting requirements, it is felt.

The gasoline market naturally is greatly unsettled by the radical adjustment that it will have to make when rationing is extended at the beginning of December to hitherto unrationed areas. The current reaction in the districts not yet rationed is comparatively heavy demand, as motorists endeavor to do Christmas shopping and attend to other matters requiring use of their cars while yet they can obtain the gasoline needed. Furthermore, for the rest of the month this stimulated eleventh hour use of motor vehicles will continue in the unrationed areas, and motorists may be expected to enter upon the curtailment program with full tanks of gasoline, with the result that total demand will be artificially high. Meanwhile, there is no great anxiety in the industry over the possibility of serious accumulation of surplus gasoline under nation-wide rationing, despite the threat that such excess would be to established prices.

Markets for neutral oils in the Western Pennsylvania refining district still are weak, while other lubricants are generally firm. Bright stocks and cylinder stocks are reported scarce, in fact, in the Pennsylvania area, and wax is in good demand. In the Mid-Continent, there is a better market for neutrals, and demand for bright stocks is firm.

U. S. Crude Production Shows Slight Increase

United States crude oil production averaged 3,879,275 barrels daily in the week ended November 14. The output was 14,100 barrels more than in the previous week.

The eight prorated states which normally account for about 87 percent of United States production, yielded 3,339,250 barrels daily, which was 48,700 barrels more than in the previous week and 39,427 barrels in excess of their combined scheduled allowables.

California showed a material increase, to 739,200 barrels daily from 709,900 the week before, and conformed very closely with the state's allowable. Kansas also increased sharply having averaged 305,950 barrels daily against 268,300 the week before and having slightly exceeded the state allowable.

Other increases included the following: Arkansas, to 74,100 barrels daily from 73,400, Indiana to 18,050 from 15,850, Michigan to 62,750 from 60,300, Mississippi to 67,150 from 66,200, and Texas to 1,374,550 from 1,373,800.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

ITEM	Crude Oil Prod. Bbls. Day (Add 000)	Crude Oil Prod. Week Ended	Runs to Stills Bbls. Day (Add 000)	Runs to Stills Week Ended	Crude Stocks Bbls. (Add 000)	Crude Stocks Week Ended	Gasoline Stocks Bbls. (Add 000)	Gasoline Stocks Week Ended	Gas Oil & Distillate Stocks Bbls. (Add 000)	Gas Oil & Distillate Stocks Week Ended	Residual Fuel Oil Stocks Bbls. (Add 000)	Residual Fuel Oil Stocks Week Ended
Highs:												
1939	3,910	8- 5	3,650	10-21	278,607	5-26	87,769	4-22	39,562	10-28	116,237	8-26
1940	3,890	3-16	3,690	6-22	265,865	8-31	102,817	4-20	49,051	10-19	109,135	9-14
1941	4,337	11-22	[4]4,120	10-18	266,187	3-29	99,727	3-29	[5]54,983	11-15	102,448	1- 4
1942	[4]4,337	2- 7	3,961	1- 3	263,208	3-28	[1]107,229	3-14	49,357	1- 3	95,857	1- 3
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-21	71,152	10- 7	20,722	4-15	105,397	4- 8
1940	3,335	11-30	3,370	1- 6	237,339	1-27	79,847	11- 9	23,551	4- 6	102,344	2-10
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	237,986	10-24	78,956	10-17	29,240	4-25	76,903	7- 4
Trends in 1942 (Week Ended):												
Jan. 3	4,038	.....	3,961	.....	244,440	.....	92,987	.....	49,357	.....	95,857	.....
Jan. 31	3,871	.....	3,848	.....	250,740	.....	97,810	.....	40,674	.....	91,189	.....
Feb. 28	4,016	.....	3,675	.....	259,373	.....	105,635	.....	34,547	.....	88,285	.....
Mar. 28	3,820	.....	3,667	.....	263,208	.....	105,624	.....	31,756	.....	83,045	.....
April 25	3,581	.....	3,506	.....	257,073	.....	102,897	.....	29,240	.....	81,107	.....
May 30	3,877	.....	3,522	.....	255,023	.....	95,355	.....	31,384	.....	79,628	.....
June 27	3,719	.....	3,581	.....	253,364	.....	88,396	.....	32,851	.....	77,304	.....
July 25	3,691	.....	3,658	.....	249,262	.....	82,281	.....	35,966	.....	77,816	.....
August 29	3,964	.....	3,697	.....	249,007	.....	80,831	.....	42,060	.....	78,034	.....
September 26	3,909	.....	3,802	.....	242,785	.....	80,550	.....	45,945	.....	78,943	.....
October 3	3,685	.....	3,879	.....	241,179	.....	80,361	.....	45,750	.....	79,036	.....
October 10	3,857	.....	3,766	.....	239,121	.....	79,731	.....	46,007	.....	78,681	.....
October 17	3,902	.....	3,709	.....	238,118	.....	78,956	.....	46,926	.....	78,537	.....
October 24	3,917	.....	3,776	.....	237,986	.....	79,545	.....	47,567	.....	79,073	.....
October 31	3,901	.....	3,731	.....	239,266	.....	79,159	.....	48,131	.....	79,166	.....
Nov. 7, 1942	3,838	.....	3,674	.....	.....	.....	79,238	.....	[4]9,034	.....	78,317	.....
Nov. 8, 1941	4,096	.....	3,995	.....	[4]243,340	.....	82,465	.....	56,209	.....	94,861	.....
Change:												
In week	—63	.....	—57	.....	+1,280	.....	+79	.....	+903	.....	—849	.....
In year	—258	.....	—321	.....	—4,074	.....	—3,227	.....	—7,175	.....	—16,544	.....
In year	—6.2%	.....	—8.0%	.....	—1.6%	.....	—3.9%	.....	—12.7%	.....	—17.4%	.....

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, November 1, 1941.

Crude Oil Production in the United States

(Estimates compiled by The Oil Weekly. All figures indicate daily averages, in barrels)

STATE OR DISTRICT	*State Allowable of Crude Production	PRODUCTION IN WEEK ENDED Nov. 7	PRODUCTION IN WEEK ENDED Nov. 14
Arkansas	74,400	73,400	74,100
California	738,000	709,900	739,200
Long Beach	.....	35,200	34,700
Midway-Sunset	.....	55,900	56,700
Kettleman Hills	.....	39,500	38,400
Wilmington	.....	95,400	96,200
Rest of State	.....	483,900	513,200
Colorado	.....	6,500	6,600
Illinois	.....	262,900	240,700
Salem	.....	36,850	34,650
Louden	.....	40,800	37,850
Other New Pools	.....	173,200	156,200
Old Pools	.....	12,050	12,000
Indiana	.....	15,850	18,050
Kansas	302,000	268,300	305,950
Kentucky	.....	12,600	12,350
Louisiana	309,800	326,100	323,050
North	.....	98,050	95,050
South	.....	228,050	228,000
Michigan	62,800	60,300	62,750
Mississippi	.....	66,200	67,150
Missouri	.....	130	130
Montana	.....	28,700	20,250
Nebraska	.....	3,300	3,250
New Mexico	94,600	111,500	100,700
New York	.....	13,850	12,200
Ohio	.....	9,950	9,700
Oklahoma	377,500	367,250	358,950
Oklahoma City	.....	69,750	61,600
Seminole Area	.....	87,300	86,350
Rest of State	.....	210,200	211,000
Pennsylvania	.....	50,600	47,100
Tennessee	.....	30	30
Texas	1,340,723	1,373,800	1,374,550
Upper Gulf Coast	.....	312,650	312,800
East Texas Field	.....	355,050	355,050
Rest of Eastern Texas	.....	94,250	95,050
Lower Gulf Coast	.....	101,500	101,600
Southwest Texas	.....	52,850	52,350
South Central Texas	.....	17,550	17,850
West Texas	.....	211,950	212,050
North Texas	.....	137,900	137,700
Panhandle	.....	90,100	90,100
Utah	.....	15	15
West Virginia	.....	10,900	9,300
Wyoming	.....	93,100	93,200
Total 8 Prorated States	3,299,823	3,290,550	3,339,250
Total United States	.....	3,865,175	3,879,275

* Details on state allowables in The Oil Weekly of Nov. 9, page 137.

U. S. Field Operations

Illinois Basin

Well to Test Benoist; Clinton Wildcat Shows

Clay County wildcat to test Benoist sand; Clinton County wildcat finds show of oil in Devonian lime; production for October totals 8,200,000 barrels as compared with 8,199,000 in September.

Clay County: Plug was being drilled at Homer Luttrell's Reed Heirs 1, SE NW NE 15-5n-5e, wildcat 2 miles north of Iola, which found Benoist sand saturation at 2294-2306 ft. Nearest production is from some small Aux Vases wells, two miles from the prospective discovery.

Clinton County: Ashoff's Hussman 1, SE NE NE 20-1n-3w, 2 miles south of Bartelso, was cleaning and testing Devonian, total depth 2477. The test was abandoned 2 years ago after finding Benoist dry but recently was deepened. Devonia was topped at 2463 and casing was set at 2470. When plug was drilled there was 10 feet of oil in the hole.

Hamilton County: Largest well of the week was Texas Co.'s J. C. Hall A-4, W½ NE NW 18-6s-6e, on the east edge of the Rural Hill pool, which swabbed and flowed 1014 barrels of oil in 24 hours following a 50-quart shot in Aux Vases sand at a total depth of 3123 ft.

Wabash County: C. E. Skiles M. Smalley 2, SE SE NE 3-1s-13w, five miles northwest of Mt. Carmel, flowed 40 barrels of oil in 6 hours from Cypress sand at 2314-23 ft but when tubing was run the flow stopped. The well is the first Cypress producer in the area and is a north offset to the field's discovery well, a Benoist producer.

Summary: There were 67 first reports during the week, an increase of 17 from the preceding week. Operations totaled 366, a gain of 12 from last week. There were 52 completions. October production totaled 8,200,000 barrels as against 8,199,000 in September. Production for the first 10 months of the year was 91,335,000. One field was discovered during the month, the Coil West pool of Jefferson County.

ILLINOIS FIELD COMPLETIONS

Clay County: Walter Duncan's L. Veith 1, nw sw se 4-5n-7e, abnd 2950 ft.

Ohio Oil's H. Pohler 2, se se nw 4-5n-7e, Weller 2494-2502 ft, 310 bbls oil, 2505 ft.

Texas Co.'s M. Bloenker 1, se sw ne 4-5n-7e, Weller 2484 ft, 188 bbls oil, 2515 ft.

Texas Co.'s W. G. Landwehr 2, nw sw nw 9-5n-7e, L. Weller 2519-2531 ft, pb 2536 ft, 248 bbls oil, 2540 ft.

Effingham County: Carter Oil's Irma Black 1, nw sw nw 6-8n-4e, Weller 1532-1549 ft, 25 bbls oil, 1556 ft.

Tidewater Oil's J. Burk 4, se ne sw 27-6n-5e, Ben 2301-21 ft, AV 2361-2379 ft, 90 bbls oil, 2379 ft.

Fayette County: H. Luttrell et al's J. Ford 3, se se nw 31-5n-3e, Bethel 1901 ft, 7 bbls oil, 1907 ft.

H. Luttrell et al's A. Rubin 1, nw ne ne 31-5n-3e, Benoist 1901-13 ft, 66 bbls oil, 1913 ft.

Paul Doran et al's J. Burk 4, s½ ne sw nw 36-6n-2e, Weller 1608 ft, 44 bbls oil, 1620 ft.

Carter Oil's E. Rhedemeyer 3, se sw ne 3-8n-3e, Weller 1492-1501 ft, Bethel 1582-1591 ft, pb 1596 ft, 180 bbls oil, 1621 ft.

Carter Oil's E. Rhedemeyer 5, sw nw se 3-8n-3e, Weller 1488-1511 ft, 492 bbls oil, 1620 ft.

Carter Oil's Tom Wright 18, nw nw se 20-8n-3e, Weller 1518-30 ft, 120 bbls oil, 1530 ft.

Carter Oil's A. Fortner 4-D, c nw sw 27-8n-3e, abnd 3129 ft.

Franklin County: E. S. Adkins' C.W.&F. Coal 2-E, ne nw se 35-6s-2e, T. sand 2137-57 ft, 40 bbls oil, 2157 ft.

Shell's T. M. McKemie 5, sw sw sw 19-6s-3e, T. sand 2151-2177 ft, 46 bbls oil, 2177 ft.

Gallatin County: Carter Oil's Oma Kinsall 1, c nw ne 21-7s-8e, abnd 2982 ft.

R. B. Martin's Straub Comm 1, se nw sw 15-8s-9e, Cyp 2481 ft, 140 bbls oil, 2517 ft.

Cherry & Kidd's Kerwin 3, sw ne sw 11-8s-10e, Tar Spgs 2058-61 ft, 125 bbls oil, 2066 ft.

Hamilton County: Texas Co.'s Dial-Heffner Comm 2, sw se sw 7-6s-6e, AV 3116-22 ft, 3 bbls oil, 3122 ft.

Gulf Refg.'s B. W. Johnson 1, nw sw sw 17-6s-7e, Cyp sd 2736-48 ft, pb 2755 ft, 30 bbls oil, 3209 ft.

Lawrence County: Bell Bros.' Robt. Hch 4, c nw nw sw 24-2n-12w, abnd 2074 ft.

Madison County: Ray Lewis' Gansemann 1, sw sw se 22-3n-6w, Trenton 2372-2395 ft, 60 bbls oil, 2395 ft.

Oberling et al's H. Buchmann 2-A, sw ne se 27-3n-6w, Trenton 2327 ft, 540 bbls oil, 2340 ft.

M. D. Bryant et al's J. Gross 1, sw nw ne 34-3n-6w, Trenton 2323 ft, 218 bbls oil, 2334 ft.

E. A. Oberling et al's Bussong 1, sw ne ne sw 34-3n-6w, abnd 2373 ft.

Marion County: Buell & Doran's Kotva 1, sw ne nw 36-4n-2e, abnd 2141 ft.

Richland County: C. R. Craft's R. McVaigh 1, c ne sw 17-2n-14w, McC 3159 ft, 192 bbls oil, 3163 ft.

Pure Oil's J. O. Coen 33, c se 4-3n-9e, Weller 2590-2594 ft, 267 bbls oil, 2650 ft.

Washington County: Conrey & Murphy's Wisniewski 1, ne ne sw 12-3s-2w, abnd 1420 ft.

Wayne County: Pure Oil's Ray Shelton 2, c ne se 35-1n-8e, abnd 3195 ft.

Schulte & Wix's Atkinson 1, ne nw se 11-1s-7e, AV 3086-3102 ft, 131 bbls oil, 3104 ft.

Sohio Prod's C. Beck 2, c se ne 19-1s-7e, McC 3255-61 ft, 616 bbls oil, 3295 ft.

Sohio Prod's Hann-Sons Comm 1, c nw nw 31-1s-7e, McC 3212 ft, 1273 bbls oil, 3225 ft.

White County: Skelly Oil's S. Fearn B-2, ne se sw 20-3s-14w, Biehl sd 1881-1890 ft, 127 bbls oil, 1891 ft.

Cal-Star Pet.'s Miller-Ford 24-B, ne ne se 21-4s-14w, AV 2837-2858 ft, 144 bbls oil, 2860 ft.

Gulf Refg.'s H. L. Rudolph 1, sw nw nw 17-4s-10e, abnd 3250 ft.

Jarvis & Marcell's Cleveland 2, se sw se 36-4s-10e, T. sd 2319-33 ft, 71 bbls oil, 3076 ft.

Jarvis & Marcell's Cleveland 1, nw ne ne 1-5s-10e, abnd 2345 ft.

National Pet.'s McQueen 6, e½ se nw sw 32-5s-10e, Clore sd 2080-92 ft, 26 bbls oil, 2094 ft.

Sinclair-Wyoming's A. S. Rudolph 17, ne nw nw 13-6s-9e, Walt sd 2265 ft, 50 bbls oil, 2276 ft.

Pure-Carter's H. Austin C-75 1, nw sw nw 17-6s-9e, Pt Ck sd 2788-2802 ft, 247 bbls oil, 2830 ft.

R. Halbert et al's Hubele A-1, sw sw nw 7-6s-11e, abnd 2232 ft.

OLD WELLS DEEPENED

Marion County: Texas Co.'s M. Williams 17, sw ne se 31-2n-2e, otd 3340 ft, Pay 3292-3330 ft in Devonian, 50 bbls oil 18 hrs, 3518 ft.

Texas Co.'s M. Williams 19, n½ nw sw sw 32-2n-2e, otd 3340 ft, Pay 3306-42 ft in Devonian, 25 bbls oil, 3530 ft.

ILLINOIS WILDCAT STARTS

Bond County: K. W. Kilpatrick's Kagey 1, se se nw 9-4n-3w, lcn.

Hamilton County: Mid-Continent Pet Corp.'s Ruben 1, ne ne ne 22-3s-6e, lcn.

Results on Industry's Prospecting Fronts

There were 49 wildcat completions in the United States last week, thus bringing the total for the year to 2753 wildcat completions.

Illinois: Well indicates production in Benoist.

Kansas: New pool is promised in Russell County.

West Texas: Two areas extended in Crockett County.

South Louisiana: Acadia Parish wildcat has large distillate flow.

Michigan: Wildcat shows for possible production.

Texas Gulf Coast: Livingston well to be deepened to Wilcox.

U. S. Drilling Operations in Week Ended November 14, 1942

STATE	ALL WELLS COMPLETED — THIS WEEK: Total	Oil	Gas	Dry	*Miscel.	Total 1942	Total this Date 1941	WILDCATS COMPLETED‡ — THIS WEEK: Total	Oil	Gas	Dry	Distillate	Total 1942
Alabama						3	5						3
Arizona						2							2
Arkansas						119	171						19
California	18	16		2		678	1,015	2			2		105
Colorado						14	17						2
Florida							1						
Georgia						2	1						2
Illinois	55	31		21	3	1,881	3,502	10			10		535
Indiana	8	2		6		343	483	4	1		3		88
Iowa							6						
Kansas	30	13	3	14		1,433	1,981	7		1	6		319
Kentucky	8	5		3		147	289	1			1		36
Louisiana	12	9	3			832	1,379						130
Michigan	15	4	3	8		611	748						156
Mississippi	1			1		96	191	1			1		38
Missouri						33	71						20
Montana						181	198						6
Nebraska						28	85						14
New Mexico	4	2		2		349	339	1			1		42
New York	23	14	1		8	1,079	912						1
Ohio	26	6	8	11	1	986	1,564						
Oklahoma	23	8		11	4	1,257	1,932	6	1		5		265
Pennsylvania	51	40	6	5		3,481	3,559						
Tennessee						8	19						5
Texas	78	43	6	27	2	4,769	9,221	17	4	1	12		956
Utah							3						
Virginia						1							
West Virginia	18		15	3		658	671						
Wyoming						88	118						9
Total this week	370	193	45	114	18	19,079	28,481	49	6	2	41		2,753
Total last week	353	208	24	101	20	18,709	27,807	37	3	1	33		2,704
Total this year	19,079	9,839	1,639	5,017	2,584			2,753	382	48	2,315	8	

* Includes old wells deepened, water intake, gas input, salt water disposal, and distillate wells.
‡ OPC program calls for 4,000 wildcats in 1942, of which 624 should produce oil and 116 gas, leaving 3,260 dry.

Marion County: A. L. Williams' Fuller 1, ne nw nw 24-4n-4e, drlg.
Richland County: Nadel & Gussman's Geo. McEvilly 1, sw sw 12-3n-14w, drlg.
Washington County: C. V. Richardson's Weihe 1, se se nw 4-1s-2w, lcn.

ILLINOIS WILDCAT COMPLETIONS

Clay County—Failure: National Pet.'s J. Smith 1, ne se nw 23-5n-5e, abnd 2342 ft.
Richland County—Failure: Nadel & Gussman's T. F. Eaton 1, se sw 26-3n-14w, abnd 3185 ft.
Helmerich & Payne et al's Bohrer et al 1, sw nw sw 30-4n-14w, abnd 3235 ft.
Saline County — Failure: Smokey Oil's Barger 1, c se se 13-10s-5e, abnd 2558 ft.
Scott County—Failure: F. L. Clapp's Fee 1, s½ nw nw ne 34-13n-13w, abnd 859 ft.
St. Clair County—Failure: Mid-Sun Corp.'s Schneppe Comm 1, sw sw ne 5-1n-8w, abnd 2001 ft.
P. S. Pritchard et al's Holliday 1, c se ne nw 31-2n-7w, abnd 2039 ft.
Wayne County—Failure: Bell Bros.' H. Allison 1, c nw se sw 4-2s-9e, abnd 3376 ft.
Cherry & Kidd's Seifert 1, c se nw 1-3s-9e, abnd 3451 ft.
White County — Failure: Gulf Refg.'s J. Harlan 1, se se se 15-7s-10e, abnd 3001 ft.

OLD WELL DEEPENED

Clark County—Failure: A. M. Myers et al's Goble 1, ne nw 20-12n-14w, otd 380 ft, abnd 690 ft.

INDIANA FIELD COMPLETIONS

Adams County: J. O. Ruff's J. H. Ruff 1, se se sw 16-25n-13e, abnd 1063 ft.
Gibson County: F. B. Hillis' B. F. Hayes 1, se ne sw 26-1n-10w, abnd 1811 ft.
Posey County: Carter & Gulf's J. Gempler C-76 2, ne se se 36-6s-14w, abnd 1301 ft.
Vanderburg County: Sells Pet.'s McCarty Unit 4-A, se ne nw 32-6s-11w, Walt 1799-1809 ft, 70 bbls oil, 1809 ft.

INDIANA WILDCAT COMPLETIONS

Perry County—Failure: United Oil's J. L. Polk 1, se se nw se 7-7s-2w, abnd 900 ft.
Posey County—New Field: C. E. Brehm et al's Hardwick 1, se se se 12-8s-14w, Pa sd 1093 ft, pump 24 bbls oil, 200 bbls wtr 24 hrs, pb 1105, 1135 ft.
Posey County—Failure: C. E. Brehm et al's Hageman 1, se sw se 12-8s-14w, abnd 2590 ft.
Spencer County—Failure: Mecca Oil et al's H. E. Parker 1, n½ s½ ne nw 32-7s-7w, abnd 1787 ft.

INDIANA WILDCAT STARTS

Harrison County: Harrison Dev. Corp.'s Walter Snider 1, sw sw ne 33-2s-4e, lcn.
Marshall County: John E. Short's Jesse Schroeder 2, ne ne nw 6-34n-1e, drlg.
Posey County: Joe Dawson et al's Dearing 1, ne ne ne 30-8s-14w, lcn.
Sohio Producing Co.'s Ries-Eilert Comm. 1, se ne nw 18-8s-13w, lcn.

OLD WELL DEEPENED

LaPorte County: L. H. Steffy & F. H. Rhodes' Mary Fritzen 1, se ne ne 7-37n-2w, drlg.

KENTUCKY FIELD COMPLETIONS

Daviess County: Basin Drlg.'s Waverly Staples 2, 25-P-27, McC 2131-32 ft, 10 bbls oil, 2132 ft.
Henderson County: D. C. Bintliff's Burbank 1, 24-Q-21, Cyp 2288 ft, 360 bbls oil, 2297 ft.
Cherry & Kidd's Burbank 4, 24-Q-21, Cyp 2300 ft, 510 bbls oil, 2309 ft.
Sinclair-Prairie's Burbank 1, 24-Q-21, Cyp 2294-2300 ft and 2304-2309 ft, 466 bbls oil, 2309 ft.
Sinclair-Prairie's Cooper 2, 24-Q-21, abnd 2361 ft.
Ohio County: J. W. Tuttle's J. C. Cobb 3, 12-N-34, abnd 338 ft.
Union County: Lindas & Whatley's R. T. Whathen 1, 10-O-19, McC 2560-2564, 93 bbls oil, 2600 ft.

KENTUCKY WILDCAT COMPLETION

Henderson County—Failure: E. D. Newkirk's G. Swann 1, 21-O-24, abnd 942 ft.

Oklahoma

Deep Wildcat Is Started In Oklahoma Panhandle

Important location in Oklahoma Panhandle; Shallow pool opener pumps; Linocln County wildcat running high.

Cimarron County: One of the most important wildcat locations of the year has been made by Pure Oil Company as their Cox 1, SW SW SE 16-5n-8ecm, Cimarron County, Oklahoma Panhandle. Well is to be drilled to Ordovician, 7,000-8,000 ft. on a block of about 60,000 acres assembled over a prominent structure that has been detailed by core drill and checked by seismograph. Location is on the northwest flank of Anadarko Basin, mentioned frequently as the last remaining major prospective province in Oklahoma.

Pawnee County: E. W. Whitney's Arnold 1, SW SE 26-22-2e, tested for 33 bbl on the pump from Prue sand, 2648-2686 ft to open a new shallow field of probable limited area.

Lincoln County: Mid-Continent Pet's Bonebrake 1, NW NW NE 33-17-5e, is running high on Pennsylvania strata at relatively shallow depth. Skinner sand showed gas estimated at 5,000,000 cu ft, and the well is deepening to the Wilcox objective with hole now bottomed near 3500 ft.

Oklahoma County: One of the state's most closely followed of recent tests is temporarily shut down with abandonment orders expected. Well is E. J. Kubat's Sanders 1, 33-11-1e, which found only brackish water in Wilcox sand after running low the last 1000 ft of hole.

OKLAHOMA FIELD COMPLETIONS

Creek County—Edna: E. R. Black's Smith 1-A, nw ne se 13-14n-10e, Dutcher 2560 ft, shot 40 qts, pump 5 bbls oil 8 hrs, abnd 2588 ft.
Creek County—Cushing: Sinclair Prairie's Litchfield 42, c e½ ne 21-17n-7e, Bartlesville 2728 ft, pump 9 bbls oil 37 bbls wtr 24 hrs, 2893 ft.
Joe Davis' Doty 1, c sw se 1-18n-7e, sand 2640 ft, pay 2644-48 ft, shot 20 qts, pump 6 bbls oil 24 hrs, 2651 ft.
Creek County — Bristow: Zephyr Drlg. Co.'s Sinclair A-2, se ne nw 34-17n-8e, Prue 2378 ft, pay 2407-36 ft, shot 60 qts, flow 50 bbls oil 24 hrs through tbg, 3440 ft.
Creek County—Forty-five: Forty-Five Oil's 43, c w½ sw ne 4-25n-12e, Bartlesville 1677 ft, hfw, abnd 1763 ft.
Okfuskee County—Cromwell: C. W. Titus' Palmer 1, ne nw nw 23-10n-8e, Cromwell 3521 ft, pb 3140 ft, perf csg at 3111-27 ft, hfw, abnd 3554 ft.
Oklahoma County—Edmond: Pure Oil's Berquist 3, sw ne se 30-14n-3w, 2nd Wx 6712 ft, dst 6259-6443 ft, 100 ft mud, abnd 6730 ft.
Pontotoc County—Whitney: H. Hurst et al's Looney 1, se nw nw 31-5n-4e, Pontotoc lime 1943-59, fill up 250 ft oil & wtr 12 hrs, abnd 1959 ft.
Pottawatomie County — Brooksville: Cities Service & Atlantic's Cade 2, c sw nw 3-8n-3e, Hunton 4895 ft, pb 4920 ft, perf csg, pump 60 bbls oil 100 bbls wtr 24 hrs, 4960 ft.
Seminole County—N. E. Sylvian: Shell Oil's Factor 1, ne ne sw 25-11n-7e, Cromwell 3654 ft, shot 20 qts 3660-73 ft, pump & flow 76 bbls oil 24 hrs, show of wtr, 3676 ft.
Seminole County — S. Konawa: American Oils, Inc.'s Burton 1, c nw nw 11-5n-5e, Hunton 2420 ft, 2000 gals acid, abnd 2685 ft.
Seminole County—Velma: Skelly Oil's W. Franklin 28, se nw se 35-1s-5w, sand 645-59 ft & 715-32 ft, shot 5 qts, pump 12 bbls oil 12 hrs, 733 ft.
Stephens County—Woolsey: Fair & Bright's Bender 1, sw se se 36-2s-6w, Arb prod, pay 1082-92 ft, pb 1267 ft, perf csg, 1000 gals acid flow 6 bbls oil 6 bbls wtr 24 hrs, 1508 ft.

OLD WELLS DEEPENED

Grady County—Knox: Ed Cox & Jake Hamon, Jr.'s Mashburn 2, sw nw nw 16-3n-5w, otd 2566 ft, sand 2928 ft, abnd 3231 ft.
Kiowa County—Hobart: Shell Oil's Ratcliff 6, ne sw ne 19-7n-17w, otd 1190 ft, lime 1250-51 ft, abnd 1251 ft.
Shell Oil's Kelsey 3, ne nw sw 20-7n-17w, otd 1136 ft, lime 1057 ft, pb to 1200 ft, pump 10 bbls oil 6 hrs, 1222 ft.
Okmulgee County — Schulter: Deardorf's Replogle 1, se se nw 31-12n-13e, otd 1191 ft, sand 1573-93 ft, 1,500,000 cfg 24 hrs, 500 lbs rock pressure, 1593 ft.

OKLAHOMA WILDCAT STARTS

Creek County: Selby et al's Gibson 1, ne NW NW 31-14n-7e, drlg 390 ft.
Grady County: Roark & Hooker's Cast 1, c nw ne 25-3n-7w, spd.
Lincoln County: Portable Drlg. Co.'s Murray 1, c nw se 24-13n-4e, reset surface & woc.
Oklahoma County: Kerlyn et al's Shadle 1, sw nw nw 7-14n-3w, spd.
Osage County: Cities Service's Osage 485, sw nw nw 16-24n-9e, mlm.
Pottawatomie County: Watchorn O. & G.'s Rogers 1, se sw se 17-9n-5e, Hog 2040 ft, DeNay 2100 ft, Ccb 2405 ft, drlg 3130 ft.
Seminole County: John Droppleman's Partridge 1, se se nw 4-11n-8e, lcn.

OKLAHOMA WILDCAT COMPLETIONS

Carter County—New Field: Lloyd Noble et al's Joliff 1-A, ne nw nw 24-5s-1e, sand & sso 1680-91 & 1775-82 ft, top Springer sd 2990 ft, gas 3067 ft, 6 mcfg, 350 bbls oil 39 grav, 20 hrs thru tbg, raised tbg to 3084 ft, 200,000 cfg, IP 349 bbls 24 hrs, now flowing 240 bbls per day thru tbg.
Comanche County—Failure: Texas Co.'s B. S. Thomas 1, nw ne se 20-4n-10w, sd & shale 3132-3250 ft, cored 3252-57 ft, Base Pontotoc 2839 ft, cored 4302-07 ft, ns, abnd 4368 ft.
Creek County — Failure: Lastecas' Jackson 1-A, sw se ne 9-18n-9e, sand 1545-55 ft, hfw, Osw 1947-90 ft, pnk lime 2020 ft, Bart 2452 ft, wtr 2515 ft, Miss 2788 ft, sg, Viola 3065 ft, Wx 3097 ft, shot 300/3097-3127 ft, swbd 20 bopd, dropped to 8 bopd, 2nd Wx 3179 ft, abnd 3187 ft.
Jefferson County—Failure: H. F. Gibson's Roy John 1, se se nw 29-3s-4w, Healdton zone 1873, Arb 2710 ft, wtr 1892-1975 ft; 2480-2594 & 2600-2676 ft, Congl sdy lime 3676-91 ft, sdy shale 2691-2712 ft, Arb 2712-32 ft, shale 2732-36 ft, lime 2736-2747 ft, abnd 2747 ft.
Logan County—Failure: Eason & Grisso's McDonald 1, ne ne nw 15-17n-1w, M. Paw 2110 ft, L. Paw 2320 ft, Avant 3290 ft, Dewey 3405 ft, Hogs 3940 ft, OC Ccb 4025-90 ft, Ceb 4220 ft, Big lime 4575 ft, Osw 4650-4750 ft, Bart 4835-40 ft, nso, base Penn & Wood 4957 ft, Mise 4997 ft, sso & gas, Syl 5030 ft, Viola 5119 ft, Dense 5157 ft, Dolo 5200 ft, 1st Wx 5210-20 ft, abnd 5248 ft.
Noble County — Failure: English Drlg's Franks 1, nw sw se 14-24n-1w, abnd 2290 ft.

Kansas

New Pool Is Promised By Russell County Test

Well west of Fairport shows good; Pratt County test finds Lansing-Kansas City saturated; offset staked to new discovery.

Russell County: A wildcat west of Fairport field, western Kansas' oldest producing area, is showing as a pool opener in Arbuckle lime, although complete test is yet to be made. Auto Ordnance Corp.'s Sutton 1, SW NW 2-12-15w, Russell County, drilled Arbuckle, 2271-2275 ft, found it saturated, and set casing preparatory to testing.

Pratt County: Added impetus has been given Pratt County's wildcat effort at Hollow Drilling Co.'s Brown 1 (B), SW SE 29-26-12w, which drilled two saturated section of Lansing-Kansas City lime at 3780 ft and between 3830 and 3840 ft. No test has been made as operator is deepening to look at Arbuckle.

Barton County: Nate Appleman's Stull 1, CS½ SE SW 6-16-12w, discovery well in Kansas City-Lansing that flowed 40 bbls hourly on test, is being offset by Darby Petroleum Co.'s Stull 1, CS½ SW SW 6-16-12w.

KANSAS FIELD COMPLETIONS

Barber County—Medicine Lodge: Barbara Oil's Lasswell 1, c sw 20-33s-13w, Chat 4659 ft, perf csg 4659-87 ft, 22,750,000 cfg 24 hrs, 4705 ft.
Barton County—Kraft-Pruso: Black-Marshall et al's Ney 2, c nw ne 17-16s-11w, Arb 3323 ft, ns, abnd 3335 ft.
Magnolia's Riemann 4, c nw se 4-17s-11w, Arb 3283 ft, fill 2200 bbls oil 2 hrs, 1000 gals acid, 3291 ft.
Ohio Oil Co.'s Reiman 2, c nw sw 4-17s-11w, Arb 3319 ft, pump 472 bbls oil 24 hrs, 3325 ft.
Barton County—Stickney: Continental's J. M. Stoskopf 2, se nw nw 20-16s-13w, Arb 3410 ft, ns, abnd 3420 ft.
Vernon O & G's Peach Est. 1, se ne nw 30-16s-13w, Arb 3398 ft, 500 gals acid 500 butane, 1500 gals acid, pump 347 bbls oil 24 hrs, 3410 ft.
Elk County—Youngmeyer: Allison & Phillips' Youngmeyer 2, nw nw ne 25-28s-8e, Arb 2851 ft, hfw, abnd 2863 ft.
Greenwood County—Quincy: Bisagno's Gilroy 10, c n½ nw ne 6-25s-13e, Miss 1639 ft, 2000 gals acid, shot 40 qts, pump 24 bbls oil 35 bbls wtr 24 hrs, 1668 ft.
Jefferson County—McLouth: O. J. Connell's Ralph Edmonds 3, c se ne 21-9s-20e, Miss 1541 ft, ns, abnd 1545 ft.
Leavenworth County—McLouth: McLaughlin's Charles Miller 1, c sw sw 22-9s-20e, top sand 1430 ft, 8 mcfg 24 hrs, 1447 ft.
Heuisman's Bracy 1, c nw sw 13-11s-21e, Miss 1115 ft, ns, abnd 1116 ft.
Marion County—Lost Springs: Adair-Morton's Schick 1, c se sw 29-17s-4e, Miss 2388 ft, ns, abnd 2478 ft.
McPherson County—Smyres: Continental's

Conrad A-1, ne sw nw 31-19s-5w, T. chat 3431 ft, abnd 3485 ft.

Phillips County—Ray: Cities Service's States 3, sw ne se 30-5s-20w, Reagan 3646 ft, perf csg, 1000 gals acid, pump 85 bbls oil 4 bbls wtr 24 hrs, 3652 ft.

Cities Service's Kohlman 1, sw nw ne 33-5s-20w, Reagan 3552 ft, pump 400 bbls oil 24 hrs, 3570 ft.

Pratt County—Iuka: Magnolia's Beck 2, sw sw nw 12-27s-13w, Simp sd 4313 ft, pay 4327-32 ft, swab 219 bbls oil 6 hrs through csg, 4332 ft.

Reno County—Peace Creek: Cities Service's Heyimun C-1, sw nw ne 12-23s-10w, Viola 3730 ft, 500 gals acid, 3000 bbls oil 24 hrs, 3742 ft.

Rice County—Smyres: Nelson's Anderson 2, ne sw sw 25-19s-6w, Miss chat 3302 ft, pump 239 bbls oil 25 bbls wtr 24 hrs, 3343 ft.

Rice County—Semi-Wildcat—Doran Pool: C. H. Weaver's Katterjohn 1, c e½ ne sw 13-19s-10w, Arb 3276 ft, 500 gals acid, 1000 gals acid, pump 9 bbls oil per hr 4 hrs, 1321 bbls oil 4% wtr, 3292 ft.

Rice County—Raymond: Hyde & Stormfeldt's Warner 1, c s½ ne nw 15-20s-10w, Lans 3084 ft, pay 3151-55 ft, 6000 gals acid, pump 425 bbls oil 10% wtr 24 hrs, 3180 ft.

Rooks County—Laton: Max Cohen's Doane 4, c s½ ne sw 35-8s-16w, Lans 3069 ft, 8000 gals acid, pump 484 bbls oil 24 hrs, 3146 ft.

Russell County—Trapp: B. D. Sidey et al's Hill 2, c e½ sw ne 20-15s-13w, Lans 3057 ft, pay 3087-3107 ft, 8000 gals acid, pump 787 bbls oil 24 hrs, 3119 ft.

Sumner County—N. Vernon: Arthur Brewer's McCartney 1, sw nw nw 14-35s-2e, T. Miss lime 3490 ft, ns, abnd 3517 ft.

KANSAS WILDCAT STARTS

Barton County: Phillips Pet's Frieb 1, se se sw 33-17s-14w, rur.

Ellis County: Auto Ordnance's Kruetzer 1, c e½ ne sw 4-13s-19w, woc.

Kiowa County: Stanolind's Rinda Williams 1, c ne ne 9-27s-16w, lcn.

McPherson County: Ray Pet's Hoglund 1, c ne ne 29-17s-3w, cellar.

Norton County: Helmerich & Payne's Paxton 1, c ne sw 10-4s-24w, cellar.

Phillips County: Carter Oil Co. & Stanolind's Vogel 1, c ne sw 26-3s-19w, lcn.

Carter Oil Co.'s T. W. Jackson 1, c nw nw 20-4s-18w, lcn.

Pratt County: Hollow Drlg's Brown B-1, sw sw se 29-26s-12w, cellar.

KANSAS WILDCAT COMPLETIONS

Edward County — New Gas Field: Cities Service's English 1, ne ne ne 8-25s-16w, Anhy 1050 ft, Ft. Riley 2300 ft, Topeka 3259 ft, Lansing 3784 ft, sso 3784-86 ft, Miss 4230 ft, Viola 4350 ft, sso 4420-35 ft, Simp 4542 ft, Arb 4617 ft, cored 4619-27 ft, ns, perf 24 holes 4422-36 ft w/gsg, pb 4060 ft, perf 12 holes 3952-64 ft, 71 holes 3960-75 ft, 12 holes 3923-27 ft, 100,000 cfg, 19,200,000 cfg 15 mins, 15,300,000 cfg 30 mins, 11,650,000 cfg 45 mins, 10 mcfg 30 mins, 6,710,000 cfg 5 hrs, 24 holes 3807-15 ft, 7,600,000 cfg ½ hr, gauged 8,800,000 cfg, perf 3807-15 ft, 25 mcfg, 4650 ft.

Leavenworth County — Failure: Heusman's Bracy 1, c nw sw 13-11s-21e, B. Hertha 390 ft, Miss 1115 ft, abnd 1116 ft.

Norton County — Failure: Cities Service's Business Men's Assn. 1, ne ne nw 6-5s-22w, Anhy 1852 ft, Topeka 3160 ft, Lansing 3404 ft, Base K. C. 3580 ft, Congl 3705 ft, Granite Wash 3733 ft, Granite 3772 ft, abnd 3375 ft.

Pratt County — Failure: Hollow Drlg's Brown 1, se se ne 5-27s-12w, Lans 3690 ft, Miss 4131 ft, Viola 4258 ft, Simpson 4310 ft, sd 4333-37 ft, Arb 4396 ft, abnd 4426 ft.

Rooks County — Failure: Helmerich & Payne's Coulter 1, nw nw sw 14-9s-20w, Anhy 1637 ft, Lans 3350 ft, Cherty Congl 3671 ft, Arb 3676 ft, cored 3699-3707 ft, abnd 3775 ft.

Sedgwick County—Failure: H. M. Williams et al's Gsell 1, ne ne se 33-26s-2e, Lans 2105 ft, KC 2460 ft, Viola 3223-26 ft & sso, rust 3226 ft, Viola 3252 ft, abnd 3227 ft.

Stafford County — Failure: Helmerich & Payne et al's Van Sickle 1, sw se se 26-25s-12w, Anhy 620 ft, Topeka 3115 ft, Lans 3608 ft, Viola 4085 ft, Simp 4170 ft, Arb 4238 ft, sso 4238-42 ft, abnd 4270 ft.

New Mexico

NEW MEXICO COMPLETIONS

Eddy County: Carper Drlg. Co.-Harry Tellyer's State 2, c sw sw 36-16s-30e, flow 72 bbls 2-in, 3-stage nitro shot 220 qts 2900-3134 ft.

Max Coll-Carper Drlg. Co.'s State 1, c sw ne 36-16s-30e, flow 100 bbls 2-in, natural, 3010-15 ft, td 3050 ft.

Otis A. Roberts et al's State-Humberger 1, 30-17s-28e, abnd 523 ft.

NEW MEXICO WILDCAT COMPLETION

Eddy County—Failure: Mac T. Anderson et al's Stevens 1, 1980 ft from n and 3300 ft from e lines 31-20s-28e, elev 3243 ft, top brown lime 350 ft, abnd 754 ft.

NEW MEXICO WILDCAT STARTS

Otero County: H. L. Hunt Oil Co.'s McMillen & Fred Turner 1, c sw se 5-26s-16e, rig for 5000-ft test.

Roosevelt County: Malco Refineries, Inc.'s Bilberry 1, c se sw 1-7s-37e, lcn 5000-ft test.

West Texas

Wells Extend Two Crockett County Areas

Two Crockett County areas extended. Upper pay discovery in Monahans pool completed without tapping main horizon. Gaines County strike given final gauge. Intermediate test for Walker and White-Baker fields opens considerable acreage for development.

Crockett County: Roger Harris and Curt Inman's Hobbs-Humble 1, C SW SW H&OB Sec 5, Blk GG, enlarged Couch pool to northeast in showing for 60-70 bbls pumper from regular lime pay 2093-2103 ft. Pipe to be run, then use acid. Olson Oil Co.'s Shannon 1, south offset to Sun's discovery pumper on Shannon ranch, filled with oil in 1 hr after drilling sandy-lime pay 2065-70 ft, and will run pipe to complete. Latter two are 1¼ miles northwest of Olson 1-well pool, which produces from 100-ft higher level.

Ward County: Shell's Sealy-Smith 2, first producer for Clear Fork (Tubb) lime in Monahans pool, flowed 759 bbls oil and 26 bbls sulphur water 2-in open tubing on completion gauge. Used 3500 gals acid through perforations 5633-43 ft, being near water level established in drilling to 5741 ft. Well logged approximately 200-ft section of gas and oil-gas zone in Clear Fork before reaching water.

Pecos County: Cardinal Oil Co.'s White-Baker 1-L, near NE NW SE GC&SF Sec 90, Blk 194, opened new territory for development in flowing 50 bbls 32-gr oil initial through 1-inch tubing after shot 80 qts 1914-32 ft. Company owns lease on all nearby acreage. Well is 1¼ miles northwest of White-Baker pool and 1½ miles south by east of Walker pool, and may prove to be an extension of either one, else link the two areas.

Discovery Wells: The Texas Company's Robertson 1, 2½ miles northwest of the Kirk pool, currently dormant, opened the fifth oil area for Gaines County in registering potential of 299 bbls 30-gr clean oil, based upon 6-hour pumping gauge. Production is from perforations 5910-50 ft in Holt zone of the Permian, and well was plugged back from 7686 ft. Official gauge was delayed some weeks in order to complete a 3-inch line to Magnolia's trunk line. In Sutton County, S. B. Roberts and M. C. Moore's Allison 2, 15 miles east of Sonora, made unsuccessful try at lowering 7-in from 3740 ft to shut off flow of 15,000,000 ft of dry sweet gas from Strawn 3754-61 ft, and has cemented pipe to complete as a gasser, being first producer for county. Allison 2 was scheduled to drill to the Ellenburger.

Crane County: Magnolia's Tucker 1, ¼-mile northeast of its McKee pool discovery in Simpson sand 6125-86 ft, drilling lime 5428 ft, with Permian-Detrital contact at 5325 ft, 86 ft low. Gulf's Waddell 42, inside location for south extension sector of Sand Hills field, found comparatively thin oil zone and flowed 63 bbls 36.7-gr oil and 61 bbls water on 14-hr completion gauge through ¾-in. Used 2500 gals acid in Ellenburger 5686-96 ft. Gulf is drilling 2 Ordovician prospects in Crane County, including Dawson 1-A that was drilling 2995 ft, while Estes 1, situated on 20,604-acre lease, had progressed to 1600 ft.

Wildcats: Humble's Newman 1, initial try for Ordovician production in Scurry County, was drilling lime and chert 8010 ft. In Gaines County, Shell's Leaverton 1 was coring at 6670 ft after encountering water at several levels. Phillips Petroleum Co.'s Price 1, Southeastern Pecos County deep project, was drilling shale 6715 ft. Shell's Blue 1, Eastern Winkler County deep test, drilling lime 7180 ft, having passed Holt section of Permian without shows. L. E. Helms et al's Harris 1, Swisher County 5500-ft project, drilling lime and anhydrite 4605 ft.

WEST TEXAS FIELD COMPLETIONS

Andrews County—Embar Ellenburger: Phillips Pet. Co.'s University-Andrews 11, c se se sec 25, blk 11, elev 3255 ft, top Ellenburger 7818 ft, flow 363 bbls 2- and ¾-in chokes, acid 750 gals 7799-7865 ft.

Phillips Pet. Co.'s University-Andrews 13, c se se sec 13, blk 11, elev 3290 ft, abnd (above Ellenburger) 7170 ft.

Cochran County — Slaughter: Anderson-Prichard Oil Corp.'s Neal 10, 440 ft from n and 2440 ft from e lines lse, leag 57, Refugio CSL, flow 599 bbls cas, acid 10,000 gals 4902-94 ft.

Honolulu's Mallet 27-A, 580 ft out swc lab 5, leag 51, Scurry CSL, flow 590 bbls 2½-in, acid 6000 gals 5013-60 ft.

Magnolia's Mallet 5-H, 440 ft from nec lab 9, leag 53, Scurry CSL, flow 344 bbls ½-in, acid 4500 gals 5020-40 ft.

Crockett County—World-Powell: H. G. Eastham et al's Shannon 1, 2200 ft from n and 440 ft from w lines e½ GC&SF 43, blk BB, abnd 2628 ft.

Gaines County—Wasson: Amon Carter-Continental's Willard 6-A, c ne sw PSL 39, blk AX, flow 431 bbls 19/32-in, acid 9000 gals 4865-5010 ft.

Amon Carter et al's Langdon 3-A, c sw ne PSL 43, blk AX, flow 712 bbls ½-in, acid 11,000 gals 4865-4990 ft.

Hockley County—Slaughter: J. C. Hawkins et al's Mallet 19-A, 580 ft from s and 510 ft from e lines lab 22, leag 47, Edwards CSL, flow 1188 bbls cas, acid 11,500 gals 4935-89 ft.

Honolulu's Mallet 27-B, 560 ft out sec lab 16, leag 48, Edwards CSL, flow 444 bbls 2½-in, acid 10,000 gals 4943-70 ft, td 4985 ft.

Humble's Coons 6, 1760 ft from w and 5400 ft from n lines PSL 11, blk X, flow 1246 bbls cas, acid 10,000 gals perf 4950-5002 ft, td 5020 ft.

The Texas Co.'s Lucas 5, 1980 ft from s and 510 ft from e lines lse, PSL 7, blk X, flow 587 bbls, plus 7.3 percent bs&w, 2-in, acid 4500 gals 4998-5031 ft.

Pecos County—Walker: Cardinal Oil Co.'s University 4-B, 1667 ft from e and 330 ft from n lines sec 24, blk 16, flow 101 bbls 1-in, shot 80 qts 2112-2131 ft.

Reagan County—Barnhart: R. R. Ogden-R. H. Hawn's University 2-B, c ne ne sec 9, blk 48, black shale-Ellenburger contact 8995 ft, flow 616 bbls, plus 8 percent bs&w, perf 9135-9200 ft, td 9246 ft.

Runnels County—Beddo: Art Tucker et al's P. Witter 1, 1512 ft from e and 500 ft from s lines blk 53, D. Diaz sur, elev 1687 ft, top Adams Branch 3272 ft, Palo Pinto 3492 ft, pump 10 bbls oil, plus 3 bbls water, 3503-35 ft, td 3539 ft.

Yoakum County—Wasson: Drilling & Exploration, Inc.'s Davis 1, c sw sw sec 729, flow 519 bbls 9/16-in, acid 9000 gals 5015-5225 ft.

T. P. Coal & Oil Co.'s Bennett 38, nw sw sw sec 630, flow 65 bbls ⅝-in, acid 10,000 gals 5200-61 ft.

WEST TEXAS WILDCAT COMPLETION

Gaines County—Oil Pool Discovery: The Texas Co.'s Robertson 1, c nw ne PSL 25, blk A-21, elev 3312 ft, Yates sand 2850 ft, brown lime 3820 ft, pump 299 bbls 30-gr, gas/oil ratio 350/1, acid 11,000 gals, perf 5910-50 ft, td 7686 ft.

WEST TEXAS WILDCAT STARTS

Scurry County: Col-Tex Ref. Co.'s M. Stewart 1, c sw sw H&TC 211, blk 97, lcn.

Col-Tex Ref. Co.'s M. Wilson 1, c sw ne H&TC 174, blk 97, lcn.

WEST TEXAS WILDCAT DEEPENED

Andrews County—Failure: Atlantic et al's University-Texu 1-A, c se ne sec 9, blk 12, otd 10,639 ft, dd and abnd 10,693 ft.

North Texas

Three Montague County Wells Are Completing

Three wildcats in Montague County in process of completion as small oil wells after plugging back from Ordovician. Clay County wildcat passes up promising show in Mississippian. Archer County records 2 semi-wildcat shallow pumpers.

Montague County: Sixth deep lime oil discovery by Sinclair Prairie in county since 1940 assured when its Henderson 2, twin to junked well on Denver geophysical prospect, unloaded fluid accumulation then swabbed 124 bbls oil and 135 bbls water daily. Production is from casing perforations 6065-75 ft in Bend, topped 5706 ft. Sinclair Prairie's Zachary 1, east outpost for Sanders pool and first to drill to Ellenburger, plugged back from water in dolomite 6735-66 ft to cement 7-in 6170 ft for completion in 6000-6100-ft Bend, with prospects of a better well in Strawn 4792-4810 ft.

R. C. Lipscomb et al's Vaughn-Harmon 1, 2¼ miles northwest of Illinois Bend and near Oklahoma border, installing pumping unit after swabbing test established adequate fillup of high gravity oil and drilling fluid to make commercial pumper from Strawn perforations 3875-80 ft. Continental's Ketchum 1, 2 miles east of Bowie, swabbed 28 bbls oil and 16 bbls water in 21 hours. Production is from Strawn 3330-36 ft.

Clay County: Youngblood & Foree's Sanzenbacher-Gulf 1, 4½ miles southwest of Henrietta, drilling 6220 ft in Simpson, topped 6154 ft. Tester used at 5995-6154 ft yielded 50 ft oil-cut mud with fair gas show from Mississippian.

Archer County: H. S. Grace et al's M. Wear 1, SWc Lot 8, I. Holeman Survey and semi-wildcat in southwest part county, pumped 15 bbls initial after 5-quart nitro shot 1273-83 ft. Same operators' Carter 1, NE Sec 38, Blk 5, Clark-Plumb Subdivision, pumped 10 bbls, sand 807-18 ft.

Jack County: Standard of Texas and Hanlon-Buchanan's Jackson 1-A, north offset to Bend producer in southeast extension of Hoefle pool, failed to kick off promptly in swabbing down for completion test in Ellenburger 5863-5916 ft, with 7-in 5897 ft. This prospective Ellenburger discovery for the pool flowed oil and rotary mud before running pipe, which may have excluded some of the pay.

NORTH TEXAS FIELD COMPLETIONS

Archer County: Wm. Clark et al's Key 2, sec 2, Meade subdiv, abnd 1460 ft.

Clay County—Watson: Roy Lee, Tr's Conrady 1, 848 ft from s and 548 ft from e lines J. H. Fisher sur A-154, top Bend 5242 ft, Ellenburger 6027 ft, flow 185 bbls ¼ to ¾-in ch, acid 3000 gals, Bend perf 5484-96 ft, td 6031 ft.

Cooke County—Walnut Bend: Sinclair Prairie's Atkins 12, 115 ft from n and 990 ft from w lines blk 69, Fannin CSL, pump 227 bbls, Snuggs sand 4832-49 ft, td 4854 ft.

Jack County—Hoefle: Taubert-McKee-Sinclair Prairie's M. Hoefle 2, 467 ft from e and 1400 ft from s lines Asbury James sur, top Bend 4810 ft, pump 112 bbls oil, plus 28 bbls water, acid 10,000 gals 4811-41 ft.

Montague County—Bowers: Seitz-Comegys & Seitz's Pitman-Conoco 1, 330 ft from w and 2300 ft from s lines Jas. Ferguson sur, top Davenport 2080 ft, abnd 3167 ft.

Throckmorton County: A. R. Matthews et al's Brockman 1, 330 ft out swc blk 94, Comanche Indian Reserve, pump 15 bbls, sand 727-34 ft.

Wichita County—K-M-A Ellenburger: E. C. Oil Co.'s Mangold 32-E, 467 ft from s and 1787 ft from e lines n½ blk 32, P. Castleman sur, pump 139 bbls oil, plus 47 bbls water, acid 6000 gals 4368-90 ft.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County—Failures: Bridwell Oil Co.'s Wilson 1-I, 330 ft from s and 990 ft from e lines ATNCL sec 32, abnd 1607 ft.

Cable Oil Co.'s Carter 1, 1470 ft from n and 330 ft from e lines ATNCL sec 96, abnd 1620 ft.

Fortex Oil Corp.-Danciger O&R, Inc.'s Conner 1, 330 ft from w and 990 ft from s lines N. A. Fitchett sur A-887, abnd 1206 ft.

White & Duncan's Thomas-Seay 1, 330 ft out swc lot 16, Nathan Thomas sur A-454, abnd 1508 ft.

Montague County — Oil Discovery: Sinclair Prairie's J. H. Eanes 1, 2660 ft from s and 735 ft from w lines of sw 40-ac of G. A. Bench sur A-1521, 6¾ mi sw Bowie, top Bend 5812 ft, Marble Falls 6117 ft, Barnett shale 6513 ft, Simpson 6748 ft, Ellenburger 6913 ft, flow 70 bbls 41.2-gr oil 1-in, natural, Bend perf 5912-22 and 5828-40 ft, td 7073 ft.

NORTH TEXAS WILDCAT STARTS

Archer County: W. T. Hutcheson, Jr. et al's N. J. Wood 1, 330 ft out sec 80-ac lse, w½ sec 11, blk 5, Clark-Plumb sur, lcn 1100-ft test.

Whitaker Oil Co.'s Wm. Coleman 1, 660 ft out nwc sec 25, Coleman subdiv of Brazos CSL sur, lcn 5500-ft test.

Jack County: Gwynn-Overby & Hanlon-Buchanan, Inc.'s Kinder 1, 396 ft from w and 1947 ft from n lines Earl Pearce sur A-467, lcn 6400-ft test.

Wichita County: C. C. Winfrey et al's J. N. George 1, sw sw sw sec 1, SA&MG sur A-268, lcn 1600-ft test.

Young County: Geo. W. Cooper et al's M. K. Graham 1, 3300 ft from n and 660 ft from w lines TE&L sec 2725, lcn 5500-ft test.

East Texas

Eastern Texas Wildcats Reach Interesting Depths

West extension in store for Coke field. Henderson County wildcat nearing decisive depth in Lower Trinity.

Wood County: Amerada's French 1, west outpost for Coke field, preparing to perforate opposite Lower Paluxy oil sand 6372-90 ft. With normal water level at 6390-98 ft, company's latest completion on north edge of field involved Conner 2, which flowed 289 bbls daily natural on ½-in, Paluxy perforations 6350-60 ft.

Henderson County: Delta Drilling Co.'s Gentry 1, 3 miles southwest of Athens, logged massive anhydrite 7729-7889 ft, elevation 383 ft, and was coring Glen Rose sandy-lime 7910 ft.

Deep Prospects: P. D. Bowlen and Grady Vaughn's Simms 1, Bowie County, drilling shale 7560 ft, being 500 ft in Cotton Valley section. In Nacogdoches County, The Texas Co.'s Strahan 1, drilling hard shale 8760 ft in Travis Peak, topped 8620 ft, according to revised call. In Wood County, Delta Drilling Co. et al's Goldsmith 1, drilling 5680 ft in Georgetown topped 5075 ft, elevation 485 ft.

EAST TEXAS COMPLETIONS

Houston County—Percilla: American Liberty Oil Co. (was Russell Grimes et al's) Ellis 1, 2700 ft from e and 700 ft from s lines John Daly sur A-342, elev 445 ft, top Woodbine 5922 ft, 29,000,000 gas, with 15 bbls distillate per million, open, Woodbine perf 5932-39 ft, td 5980 ft.

Smith County—Chapel Hill: Sinclair Prairie's Walton 2, 775 ft from n and 483 ft from e lines 109¼-ac lse, John Wolfe sur, flow 352 bbls 2-in, gas/oil 819/1, acid 5000 gals Pettit perf 8047-79 ft, td 8268 ft.

Wood County—Coke: Amerada's J. D. Kennemar 1, 467 ft out swc 98.15-ac lse, Berry Smith sur, top Paluxy 6342 ft and water 6410 ft, flow 366 bbls ¼-in, Paluxy perf 6388-98 ft, td 6416 ft.

Amerada's Conner 1, 467 ft out sec 90.92-ac lse, Berry Smith sur, top Paluxy sand 6285 ft, flow 528 bbls ½-in natural, Paluxy perf 6360-70 ft, td 6375 ft.

Jerry Hawkins et al's Clark 2, 467 ft from s and 1010 ft from e lines 137.16-ac lse, Berry Smith sur, top Paluxy 6270 ft, flow 382 bbls ¼-in, perf 6297-6345 ft, td 6349 ft.

Wood County — Hawkins: Humble's B. F. Allen 10-D, 1383 ft s of middle n line and 3302 ft from m/e/e line 44.76-ac tr, Geo. Brewer sur, elec 360 ft, top Woodbine 4554 ft, abnd 4825 ft.

Humble's Tom Jackson 1-D, 1150 ft from w and 1950 ft from n lines Geo. Brewer sur, flow 375 bbls ¼-in, perf 4665-73 and 4805-19 ft, td 4870 ft.

Humble's W. R. Parrish 3, 467 ft from w and nw lines 134.53-ac lse, H. E. Watson sur, elev 359 ft, top Woodbine 4436 ft, abnd 4559 ft.

Humble's J. C. Snow 2, 467 ft from m/e/s and 467 ft from m/s/w lines 211.55-ac lse, J. B. Crain sur, elev 372 ft, top Woodbine 4659 ft, abnd 4955 ft.

Humble's B. A. Wells 4, 1400 ft from e and 467 ft from n lines 141.08-ac lse, Geo. Brewer sur, elev 415 ft, abnd in Georgetown 4547-76 ft.

EAST TEXAS SALT WATER DISPOSAL

Smith County—Van Field: Van Salt Water Disposal Co.'s Fee 1, 250 ft out sec 10.86-ac tr, John McFadden sur, Austin chalk 3500-3701 ft, Woodbine 3941 ft, Georgetown 4710 ft, perforated 4434-4562 ft, td 4730 ft.

EAST TEXAS WILDCAT START

Anderson County: Shell's E. H. Massey 1, 640 ft out swc of 117.8-ac tr, Francis Bettick sur, 2 mi ne Tennessee Colony, sp.

Texas Panhandle

FIELD COMPLETIONS

Gray County: Phillips Pet. Co.'s Eakin 1, se se nw H&GN 204, blk B-2, elev 3298 ft, 5,200,000 gas open flow, acid 6300 gals shot 340 qts 2790-2910 ft, td 3131 ft.

Skelly Oil Co.'s Jackson-East 3, ne se se H&GN 62, blk B-2, elev 3074 ft, abnd hfw 3310 ft.

Hutchinson County: J. E. Crosbie, Inc.'s Pitts 50, 580 ft from m/n/n and 2976 ft from m/w/e lines T. C. Ry. 7, blk M-21, pump 208 bbls, shot 480 qts 2730-2830 ft.

C. J. Oates et al's Starnes 6, 330 ft from s and 1700 ft from w lines T. C. Ry. 24, blk M-23, pump 54 bbls, shot 940 qts 3054-3175 ft.

TEXAS PANHANDLE WILDCAT START

Oldham County: Humble's Matador 1-E, 2640 ft from s and 6600 ft from w lines Leag 329, State Capitol Lands, 91, 100-ac lse, lcn 6500-ft test.

Southwest Texas

Wildcat in West Ganado Area Making Flow Tests

Wildcat south of West Ganado testing through perforations. Stewart field outpost set pipe for test.

Jackson County: Renwar Oil Co. is making first production tests on Freeman 1, wildcat one mile south of West Ganado field and west of Stewart field. Perforations were made in sand at 6646-51 ft and testing is now underway. This area, which has been named Mustang Creek by South Texas Nomenclature Committee, has been active in recent months due to discoveries throughout the county.

Bottomed at 6651 ft, the well recovered 1800 ft of pipe oil on a drill stem test before flow string was set. Location is in northwest corner of 125-acre tract in south portion of William Menefee survey, abstract 53.

Outpost: Harrison & Abercrombie are testing Betts 1, semi-wildcat one mile west of Stewart field production, Jackson County. With hole bottomed at 5030 ft, 5½-in casing was set to that level, and first flow test will be made in 5000-ft discovery pay. Location is in George Sutherland survey, abstract 75. J. A. Gray was contractor.

Wildcat: W. Stewart Boyle is moving in on Banker 1, wildcat 1½ miles east of Maurbro field, Jackson County. It is on north 236-acre tract of 473-acre tract in IGN survey, abstract 187. Projected depth is 6000 ft with Cities Service, Seaboard Oil, Fohs Oil and Sinclair supporting the test.

Discovery: The Texas Co. is preparing to test Collier 2, wildcat in East Navidad area, Jackson County, after coring sand section at 2435-55 ft showing production. Casing was set to 2431 ft for the test. This well is the company's third test on prospect, the first well, Collier 1, recovering some oil and gas on a drill stem test.

Edwards Lime: Humble Oil has reached top of Edwards lime in Soech-

thing 1, second well in Imogene area, Atascosa County. The well is bottomed at 7581 ft in lime and production test is under way.

LOWER TEXAS COAST FIELD COMPLETIONS

Aransas County—St. Charles: Continental's St. Charles Co. 5, 1870 ft fr nl and 3114 ft fr el R. D. Blossman sur 196, perf 8220-45 ft, abnd 9859 ft.

Bee County—South Caesar: Luling Oil and Gas Co.'s Slick 3, 467 ft fr s and el's 552.6-ac tr, W. F. Hodge sur AB-175, td 6605 ft, perf 6513-18 ft, 3,700,000 cf gas and 66 bbls distl, ¼-in and ⅜-in chks, perf 6602-05 ft, 138 bbls on ⅛-in ch.

Jackson County—Stewart: W. Stewart Boyle's Simmons 1, 660 ft fr n and wl's 160-ac lse, Geo. Sutherland sur, 6500 ft test, td 1010 ft, temp abnd.

Jackson County—North Laward: Cities Service' Orsag 1, 330 ft fr s and wl's of 100-ac lse, Jessie White sur, td 6384 ft, perf 5208-23 ft, 331 bbls on 3/16-in ch, go ratio 247/1.

Jackson County — West Mauritz: John B. Coffee's Mauritz 2, 660 ft fr wl and 1980 ft fr sl of 215.1-ac lse, M. L. York sur 22, perf 5467-72 ft, 121 bbls 7/64-in ch.

Jackson County—North Laward: Glenora Oil Co.'s Olsovsky 4, 950 ft fr nl and 632 ft fr el of blk 9, C. S. Woolfolk Colonial Ld. Co. sbdn, I&GN sur 2, 295.58-ac lse, td 5683 ft, perf 5207-28 ft, 77.28 bbls on 7/64-in ch.

Jim Wells County—Ben Bolt: Bridwell Oil Co.'s Hoffman 1-I, 1477.7 ft fr nl and 442 ft fr wl of 200-ac lse, LaTrinidad gr, td 5858 ft, perf 5303-10 ft, 500,000 cu ft gas and distillate 32/64-in ch.

Nueces County—South Clara Driscoll: Dan L. Clark's Schubert 1, 330 ft fr n and el'l of sw¼ sec No. 130, Geo. H. Paul's sbdn of Driscoll Rch, on 160-ac tr, td 5295 ft, abnd.

LOWER TEXAS COAST WILDCAT COMPLETIONS

Hidalgo County—Failure: Rowan & Hope Inc.'s Baker 1, 9240 ft fr wl and 7629 ft fr el of 14,725.2-ac Rch, 27 mi nw of Edinburg, in Santa Anita gr, abnd 7508 ft.

Karnes County—Failure: R. J. Hofman's Warzecha 1, 660 ft fr ne and sel's 200-ac lse, David Austin sur, 17 mi w-nw of Yorktown, abnd 2010 ft.

Goliad County — Sarco Creek discovery: Ginther, Warren & Ginther's Wood 1, 1320 ft fr sl and 1400 ft fr sel of 500-ac lse, Domingo Morris gr, td 5253 ft, perf 4170-80 ft, 3,000,000 cf gas and spray of distil on ¼-in ch with abt 180,000,000 cf open flow.

LOWER TEXAS COAST WILDCAT STARTS

Bee County: Herb E. Dirks' Page 1, 660 ft fr ne and sel of nw 500-ac of 757-ac tr, Thos. Pilkington sur, 1 mi se of Mineral, 7800-ft test, lcn.

Bee County: Smith & Story, Inc.'s McNeill 1-A, 990 ft fr sw and 660 ft fr nwl of 320-ac lse, Carmen Molina Gr, 8 mi ne Beeville, rig up.

Hidalgo County: Sun's D. D. Oil Co. 1, Newman subdn El Benadito grant, 1980 ft fr w and nl sec 23, 3622-ac lse, 24½ mi n Mission, 9000-ft test, lcn.

Jackson County: Texas Co.'s Collier 2, East Navidad area, 1980 ft fr sw and 660 ft fr nwl of ne 830-ac lse and abt 2300 ft fr nel and 5400 ft fr sel Jas. Kerr sur A-39, 5000-ft test, spud.

Victoria County: Rowan & Hope's McCampbell 1, 660 ft fr nw and sw'l of 240-ac lse in V. Garcia sur, 6 mi s of Inez, 6500-ft test, lcn.

SOUTHWEST TEXAS FIELD COMPLETIONS

Duval County—Casa Blanca: M. L. Massingill's Duval Co. Rch. Co. 18, 330 ft fr el and 990 ft fr sl of 80-ac lse, GC&SF sur 294, 5½-in 1019 ft, pump 19 bbls, td 1060 ft.

Starr County—Rincon: Continental's Slick 7-D, 2946 ft fr el and 330 ft fr sl of CCSD&RGNG sur 219, 6-in 3972 ft, td 3972 ft, perf 3964-70, 201.85 bbls on 3/16-in ch.

Starr County—Garcia: Sun's Garcia Ld. & Livestock 4-A, 417 ft fr nl and 660 ft fr el of unit "D," 3230-ac lse, td 3763 ft, 112.9 bbls on 9/64-in ch, top sd 3743 ft.

Starr County—North Sun: Sun's Olivares 2, 496 ft fr s'ly sl and 495 ft fr w'ly el of 270.03-ac lse Santa Teresa gr, td 4555 ft, top sd 4547 ft, 124.5 bbls on 9/64-in ch.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

Jim Hogg County—Failure: Sun's Brooks 3, 660 ft fr wl and 4620 ft fr sl Santo Domingo de Abajo gr, 7050-ac lse, abnd 5205 ft.

McMullen County—Failure: J. W. Gorman's Atkinson 2, 1980 ft fr n and el's AB&M sur 125, 640-ac lse, abnd 2167 ft.

SOUTHWEST TEXAS WILDCAT START

Duval County: J. O. Nelson's Yates Est. 1, 660 ft n, th 660 ft e fr ne cor J. Poitevent sur 231, well in SA&MG sur 1, 5 mi nw of Fitzsimmons field, 4000-ft test, lcn.

SOUTH CENTRAL TEXAS FIELD COMPLETION

LaSalle County:—Washburn: Quintana's South Texas Synd. 15, 1866 ft fr wl and 3066 ft fr sl of JJ & AJ Dull sur 94, td 5100½ ft, top Wilcox 5096½ ft, 389.8 bbls on ¼-in ch.

SOUTH CENTRAL TEXAS WILDCAT COMPLETIONS

Frio County—Failure: Wiegand Bros.' Gilliam 1-A, 467 ft fr swl and 3000 ft fr sel of lot "A," BS&F sur, sw Pearsall townsite, show oil 5714 ft, temp abnd 5989 ft.

Milam County—Failure: Rosener & Blankenstein's Garner 1, 360 ft fr sl and 623 ft fr el of S. C. Robertson sur, 5 mi n of Rockdale, 1077 ft fr el and 360 ft fr sl of 40-ac lse, abnd 650 ft.

SOUTH CENTRAL TEXAS WILDCAT STARTS

Dimmitt County: W. J. Walton's McKnight Est. 1, ctr nw¼ se¼ I&GN sur 23, blk 13, 80-ac lse, 4½ mi sw of Carrizo Springs, 3000-ft test, lcn.

Travis County: Robert E. Fallin's Wolters 1, 1524 ft fr nl and 1773 ft fr w'ly wl 295-ac lse, Michael Green sur, 15 mi se Austin, Navarro test, lcn.

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Texas Gulf Coast

Livingston Well Will Be Deepened to Wilcox

Livingston well to be deepened to test Sparta and Wilcox sand sections. Tests continued in two Wilcox wildcat wells.

Polk County: Gem Oil Co. is seeking permit to deepen a well, Davis and Holmes 6, in Livingston field to make test of Sparta and Wilcox sands. Production from these two sections was opened recently and several other wells are due to be drilled deeper in field proper. Location of the well to be deepened is on 157-acre tract in A. Viesca 7-league grant. New contract depth is 8500 ft.

Wilcox Trend: Ohio Oil Co. is continuing tests on Kaechely 1, Wilcox wildcat on Orange Hill prospect, Austin County. Last set of perforations was made at 9050-67 ft and 9080-9145 ft. On previous tests the well flowed oil and water and some distillate. Several more flow tests are scheduled on this wildcat, which has assured opening of some type of field. Total depth is 10,104 ft with 5½-in casing set to 9411 ft.

Montgomery County: LaGloria Corporation (Gray and Wolfe) are making additional tests on Grogan-Cochran 1, deep Wilcox wildcat on Pinehurst prospect. Bottomed at 11,921 ft with 4½-in liner set at 11,903 ft, the well is credited with having several gas-distillate sands capable of making a producer. Location is in A. Prather survey. Original contract depth of this well was 10,300 ft, but due to showings to that depth it was decided to drill and check formations that produce from deep inside Wilcox at Lake Creek, also in Montgomery County.

Mercy: Shell Oil has completed another producer at Mercy, San Jacinto County. The Central Coal and Coke 3, which gives the field a slight southeasterly extension, flowed 171 barrels through ⅛-in choke after drilling to 8274 ft and setting 5½-in pipe to 8261 ft. Sand was topped at 8242 ft.

Matagorda County: Stanolind has spudded a deep test in Lucy area, location being Huebner 3 in Elisha Hall survey. It is three-quarters of mile southwest of production.

Texas Co. set 7-in protection pipe to 6610 ft in Hamill 1, deep projected wildcat in Sargeant area, Matagorda County. Location is in William Baxter survey. This will be deepest test ever drilled in area.

TEXAS GULF COAST FIELD COMPLETIONS

Harris County—Dyersdale: Jack W. Frazier's Wood 2, 43-ac tr, Whitney Britton sur, perf 3462-72 ft, flowed gas, ungauged, td 9206 ft.

Jefferson County—Stowell: Glenn H. McCarty's Stewart 1, 80-ac tr, Theo F. Koch subdvn, TNO sur sec 157, set 5½-in 9127 ft, perf 8687-89 ft, 292 bbls 11/64-in chk, td 9205 ft.

Jefferson County—Lovell Lake: Humble's Jefferson Land 30, 2313-ac tr, C. Hillebrandt sur, t/sand 7776 ft, set 5½-in 7773 ft, flowed 195 bbls ⅛-in chk, td 7773 ft.

TEXAS GULF COAST WILDCAT COMPLETIONS

Liberty County—Failure: Hebert & Smith's Conger 1, Nome area, 200-ac tr, John Blair sur, abnd 7240 ft.

Trinity County—Failure: Magnolia Petroleum's Cameron Est. 1-C, Glendale area, 5000-ac block, J. A. Sepulveda sur, abnd 7160 ft.

TEXAS GULF COAST WILDCAT STARTS

Polk County: H. B. Jordan's Texas Long

Leaf 1, Hortense area, 50-ac tr, I. B. Thomas sur, spudding 6500-ft test.

Wharton County: Continental Oil Co.'s Allenson 1, 9 mi n Louise, 334-ac tr, sec 41, lcn 6000 ft test.

Wharton County: Franklin & Tidemann's Jones 1, 272-ac tr, William Kincheloe sur, A-37, lcn 6000-ft test.

Jefferson County: Stanolind's Fitzhugh 5, west flank Big Hill, 356-ac tr, Stephen Eaton sur, lcn 7500-ft test.

Louisiana Gulf Coast

Branch Discovery Has Large Distillate Flow

Branch area field discovery flows estimated 2400 barrels distillate daily. Old producer at Venice completed in deeper sand.

Acadia Parish: Union Sulphur has been attempting to shut in Gueno Est. 1, wildcat on Branch prospect that apparently is opening major gas-distillate producing area. The well blew out while drilling at total depth of 10,447 ft. It caught fire and burned several days before blaze was controlled. Operators last week were unsuccessful in shutting in the producer due to high pressure sands, and the well flowed estimated 2400 barrels of 51 gravity distillate through four 4-inch flow lines using 2-inch outlets.

When well blew out drill pipe was stuck in hole. The pipe dropped in hole, however, when blowout preventers were finally installed. Operators staked location for Gueno Est. 2, 1200 ft north of the discovery and had planned to drill a directional hole had the fire not been controlled. Both the location and the well are in section 51-8s-2e.

Plaquemines Parish: Tide Water has completed Manhattan 7, section 26-21s-30e, at Venice in a deeper sand. Deepened from 7205 ft to new total depth of 8506 ft, 5-in liner was set at 6443-8074 ft. Perforations were made at 8018-30 ft, screen and tubing were set for completion. On official gauge the well flowed 170 bbls through ⅛-in choke with 900 pounds tubing pressure. Tide Water has another well, Buras Levee 20, drilling at Venice around 8300 ft.

St. Charls Parish: Gulf Refining is testing Delta Securities 2, second well north of Bayou Couba discovery. The well, located in section 13-15s-21e, is bottomed at 6449 ft and perforations were made at 6342-50 ft and 6318-26 ft. Sufficient sands were encountered to make a producer. It is one-half mile north of Delta Securities 1.

Vermilion Parish: Union Oil (California) is making more flow tests on Louisiana Furs 1-C, wildcat on Fresh Water Bayou (Chenier au Tigre) prospect that has indicated opening of new gas-distillate field. Previous production tests were made at 11,582-88 ft and 11,486-93 ft, however, casing was split and further operations were delayed until repairs could be made. These two sets of perforations showed gas and distillate. Location of the wildcat is in section 33-16s-2e. Total depth is 11,985 ft with 5½-in casing cemented to 11,692 ft.

SOUTH LOUISIANA FIELD COMPLETIONS

Evangeline Parish—Pine Prairie: Stanolind's Ardoin 3-A, 935 ft s & 1084 ft w oc ctr of sec 37-3s-1w, perf 8244-84 ft, flowed 162 bbls 10/64-in chk, td 8350 ft.

Calcasieu Parish—Starks: W. T. Burton's Industrial Lumber 8, 550 ft w & 1300 ft s of ne cor sec 30-9s-12w, set 7-in 3990 ft, sand 3990-4016 ft, flowed 121 bbls ⅛-in chk, td 4016 ft.

St. Charles Parish—Paradis: Texas Co.'s Lawler 1, 2354 ft s & 2952 ft e of ne cor fractional sec 8 in sec 39-14s-20e, perf 10,220-29 ft, 185 bbls ⅛-in chk, td 10,400 ft.

North Louisiana

Operations Started on Morehouse Parish Well

Second well begins in Beekman area in Morehouse Parish. New Elm Ridge area of LaSalle Parish has dry hole in second operation.

Morehouse Parish: Union Producing Company has started drilling operations a mile east from the company's discovery well, Crossett A-1, C SW NE 6-22n-6e. New test is the Crossett A-2, 2002 ft west and 1993 ft south of the northeast corner of Section 5-22n-6e.

The discovery well on initial production, flowed 33 barrels of oil and 1,200,000 ft of gas daily, gas-oil ratio 35,000,000-1. Pressure on tubing 1100 pounds and casing pressure gauged at 1350 pounds. Well bottomed at 6956 ft and perforations were in numerous horizons before being finaled as a field opener.

LaSalle Parish: Carter Oil Company has abandoned, at 5298 ft, Tensas Delta A-3, second test for the Elm Ridge area, spotted C NW NW 36-6n-4e. Operators encountered Wilcox at 4106 ft about the same as the discovery well, Carter-Phillips' Tensas Delta A-2, C SE SW 25-6n-4e. Tensas Delta A-2 was perforated at 4572-75 and flowed 201 barrels of 42.5 gravity through a ¼-inch tubing choke in 24 hours. Total depth of the Tensas Delta A-2, 4582 ft.

NORTH LOUISIANA FIELD COMPLETIONS

Claiborne Parish—Sugar Creek: Roy Lee's Keen 1, c se sw 7-19n-5w, completed, no gauge, wtg on tanks, td 6105 feet.

Hinton's Lowe 1, 9-23-8, flow 12 bbls per hr, ¼-in, cp 350, tp 350, 3000 gals acid, perf 5409-21, td 4590 ft.

Haynesville: Midstates Slayton-Standard Oil 1, 12-23-8, flow 11 bbls per hr, 24/64-in, cp 480, tp 100, 7000 gals acid, perf 5326-44, td 5410 ft.

Midstates Waller 3, 1-23-8, flow 16½ bbls per hr, ¼-in, cp 975, tp 600, 5000 gals acid, perf 5346-66, td 5430 ft.

Midstates Waller 4, 2-23-8, flow 30 bbls per hr, ¼-in, cp 1200, tp 450, 5000 gals acid, perf 5344-64, td 5425 ft.

Caddo Parish—Rodessa: Tide Water's Sexton 13, 14-23n-16w, plugged back from 6010 to 5700 ft. Perf in Hill sand at 5685-97 ft, tested 2,850,000 ft of gas open flow.

LaSalle Parish — Nebo-Hemphill: Hunt's Goodpine F-124, c sw se 5-7n-3e, perf 3836-40, flow 230 bbls, tp 450, cp 1100, td 4169 ft.

Union Parish—Monroe, Gas Field: United Carbon Co.'s Union Power C-9, 21-21-3e, flow 8,015,000 cubic ft, rp 970, td 2183 ft.

United Carbon Co.'s Union Power C-10, 21-21-3e, flow 8,015,000 ft, rp 915, td 2183 ft.

Arkansas

McKamie Field Area Extended Southward

Wildcats spotted in South Arkansas, Lafayette County's McKamie field extended south. New London northwest outpost testing.

Bradley County: Placid Oil Co. is drilling below 2520 ft in Murphy 1, C NE SE 3-16s-10w. Placid's Murphy 2, C SE SE 28-15s-10w and Murphy 3, C SW SW 16-17s-10w are below surface casing. Placid abandoned Southern Lumber Co. 1, C NE SE 11-16s-12w. The Smackover lime, occurring at 4800 ft, is the objective.

Calhoun County: Northwest of Placid's Bradley County activities Skelly's Calion Lumber Co. 1, C NE SE 27-15s-14w, had shows of dead oil after topping the Smackover lime at 4923 ft. Cores taken at 4925-59 ft showed lime and dead oil. Cotton Valley marker topped at 3270 ft with no shows.

Hempstead County: Barnsdall's Schultz 1, C SW NE 20-14s-25w, topped the Travis peak at 3840 ft and is below 5150 ft exploring near projected depth of 5700 ft.

Lafayette County: Two completions have extended the McKamie gas-distillate pool. Most southern extension is Atlantic's Bodcaw 10, C of SW¼ of 32-17s-23w which flowed 22 barrels of 54 gravity distillate per hr through a 12/64 in tubing choke. Casing was perforated at 9343-53 ft, gas oil ratio is 5000-1. The well is bottomed at 9400 ft and in early production flowed 34 gravity crude oil.

At a diagonal northwest offset to Atlantic's Bodcaw 10, Carter Oil Co. added another south extension in McClendon 1, C NW¼ 36-17s-24w. Flow from 9240-80 ft was 134 bbls of 62.4 gravity distillate per day through a 19/128-in tubing choke. Total depth of the McClendon 1 is 9245 ft.

Union County: C. H. Lyon's Agerton 1, a northwest extension prospect to the New London field, C SW SW 12-18s-12w, encountered saturated sands at three horizons in cores at 5838-88 ft. Pipe was set at 6134 ft and operators are preparing to complete the test.

SOUTH ARKANSAS WILDCAT STARTS

Calhoun County: Placid's Freeman-Smith Land Co. 1, c ne se, 24-15s-13w, lcn.

Columbia County: Roy Lee's Pickler 1, c sw e 23-17s-21w, dr.

Southwood's Medlock 1, c se ne 12-16s-19w, dr.

Union County: Wheeles' Union Saw Mill 1, c sw nw 11-8s-12w, fish.

California

Location Made for Wildcat In City of Los Angeles

Kern County Naval Petroleum Reserve extended; location staked for Los Angeles City deep test; Santa Barbara County test gets oil showings; further exploratory work started in old Ventura County area.

Kern County: A southwestern extension of the Elk Hills Naval Petroleum Reserve No. 1 approximating 5300 acres has been effected by signing of Executive Order No. 9257 by the President. New acreage added to reserve embraces seven full sections and portions of seven additional sections. Extension acreage lies to the southeast of Buena Vista Hills oil field and is unproven territory.

Los Angeles County: Having obtained clearance of legal restrictions on drilling in residential areas and franchise rights for pipeline connections, Shell Oil Co. has staked location for its deep test of the old Salt Lake shallow field in the heart of the Los Angeles Wilshire residential district. Location for the test is in the "Gilmore Island" tract.

Salt Lake field was discovered in 1892 by E. L. Doheny, who dug the first well with pick and shovel. Production was

obtained from sands ranging in depth from 400 to 3000 feet. Conventional drilling equipment is to be used in initial test but construction of suitable buildings in which to house drilling equipment after a discovery is made, will be required.

Santa Barbara County: Tide Water has recovered some heavy formation oil from its Davis No. 1 wildcat in the Zaca area, Sec 33-8-31, bottomed in hard Miocene gray sand and claystone at 6643 ft, plugged to 5956 ft. Recovery has consisted of 12-14 gravity formation fluid and circulating oil together with considerable water. Pumping test will be continued over extended period to determine prospects.

Ventura County: J. J. Stevens is undertaking extensive geophysical exploration work on the William Boosey property, Sec 31-4-20, Santa Paula district, some 5 miles due east of the city of Santa Paula. Shell has also initiated a leasing campaign in this area, having taken 14 properties embracing several hundred acres. Earlier tests drilled in this area uncovered fair showings from 720 to 1133 ft, but failed to find commercial production in shallow sands or at greater depth.

CALIFORNIA FIELD COMPLETIONS

Fresno County—Coalinga old field: Standard's 100-7C, 968 ft n 2452 ft e swc 7-20-15. Pumped 24 bbls 17-gr 50 ft, perf ldd 2044 ft, td 2321 ft.

Kern County—Belridge South: Belridge's 56A-33, 1588 ft n 2230 ft w sec 33-28-21, pump 60 bbls 14.2-gr 309 ft, perf ldd 753 ft, td 753 ft.

Belridge's 28-34, 495 ft n 1161 ft e swc 34-28-31, pump 70 bbls 15-gr, perfs 396-604, 626-668, 728-800 ft, td 800 ft.

Belridge's 38-34, 496 ft n 1825 ft e swc 34-28-21, pump 90 bbls 19.6-gr, perfs 399-775 ft, td 775 ft.

General Petroleum's Belridge 3-30A, 427 ft n 3106 ft e w¼ c 3-29-21, pump 46 bbls 13.8-gr 421 ft, perf ldd 976 ft, td 1000 ft.

General Petroleum's Belridge 3-33, 653 ft n 3885 ft e w¼ c 3-29-21, pump 66 bbls 12.4-gr 419 ft, perf ldd 914 ft, td 921 ft.

Ohio's Emily Hopkins Fee 7, 769 ft s 716 ft w nec 4-29-21, pump 60 bbls 14.5-gr, perfs 606-850 ft, td 852 ft.

Kern County—Kern Front: General Petroleum's Young 1, 235 ft s 310 ft w nc 14-28-27, pump 56 bbls 14.2-gr 93 ft, perf ldd 1969 ft, td 1998 ft, pd 1970 ft.

Standard's No. 30, 1650 ft n 330 ft e s¼c 15-28-27, pump 117 bbls 125 ft, perf ldd 2323 ft, td 2325 ft.

Kern County — Midway-Sunset: Chanslor-Canfield's No. 43-9, 556 ft s 920 ft e w¼c 9-32-23, pump 32 bbls 14.7-gr 201 ft, perf ldd 1674 ft, td 1815 ft.

H. & T. Oil Co.'s No. 6, 830 ft n 1339 ft w sec n½ nw¼ 15-31-22, pump 55 bbls 12.9-gr, td 2850 ft, pd 920 ft.

Los Angeles County—Montebello: Standard's Baldwin 93, 1019 ft s 463 ft e nwc 1-2-12, pump 113 bbls 17.1-gr 436 ft, perf ldd 2899 ft, td 2900 ft.

Los Angeles County—Newhall - Potrero: Barnsdall's RSF 32, 9150 ft s 12,867 ft e c "J." NO est, top gray sand 7300 ft, perfs 6752-6859 ft, 6934-7013 ft, td 7415 ft, pd 7015 ft.

Orange County—Huntington Beach: Southwest Exploration Co.'s State 47, 267 ft n 4187 ft w c/l 23rd and Ocean, pump 581 bbls 25.3-gr 568 ft, perf ldd 4895 ft, td 4895 ft.

Santa Barbara County—Santa Maria Valley: Hancock Oil Co.'s Resenblum 4, 330 ft n 990 ft w c 25-19-34, flow 892 bbls 14.4-gr 955 ft, perf ldd 4680 ft, top Miocene 3715 ft, td 4680 ft.

Union's Vincent 8, 330 ft n 330 ft w e¼c 25-10-34, flow 1414 bbls 14.9-gr, 48/64 bean, 1219 ft spot, perf ldd 4638 ft, td 4646 ft.

CALIFORNIA WILDCAT COMPLETIONS

Kern County — Wildcat Failure — Midway-Sunset area: Richfield's Southwestern 12, 1396 ft s 3695 ft e w¼c 2-21-22, abnd 1310 ft in wet oil sand topped 1225 ft.

Los Angeles County — Wildcat Failure—Puente area: Shell's Garnier 1, 1653 ft ely on n line of nec lot 1, tract 517, thence 490 ft sly at r/a, sec 31-1-10, no showings, abnd 4591 ft.

CALIFORNIA WILDCAT STARTS

Fresno County: Robert S. Lytle's Lobre 43-22A, sec 24-19-15, Coalinga area, lcn.

Kern County: Ring Oil Co.'s Glide 2, sec 19-26-28, rig up, Mount Poso area.

Union's Houchin 23-34, sec 34-31-26, lcn, Paloma area.

Ventura County: Pacific Western's Temoscal 15, sec 4-4-18, lcn, Piru area.

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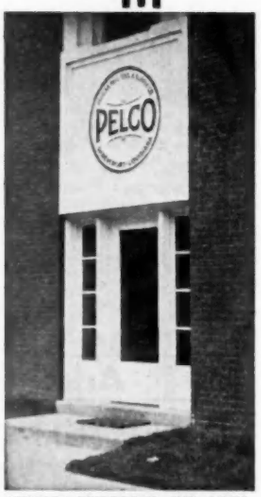

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Wildcat Shows Oil-Gas In Richfield Horizon

Wildcat in Missaukee shows oil-gas in Richfield horizon between 4400 and 4500 ft. Second failure narrows prospects in new Fork pool, Mecosta County.

Missaukee County—Enterprise: Sun Oil Co.'s State A1, S½ SW NW, 11-23n-5w, wildcat, carried 200 ft of fluid at 4482 ft, with an oil pay at 4468 ft, and a show of water at 4479 ft. Test is now drilling below 4504 ft but probably will bottom at less than 4600 ft. Unless bigger pay in Richfield is developed hole due to be plugged back to 3400 ft and tested for Dundee production.

Mecosta County—Fork: Prospects in the new Fork field took a slump when Sun Oil Co.'s Murray 2, S½ SW NW, Section 5-16n-7w, 1320 ft north of the discovery, dropped 10 ft on Dundee structure and bottomed dry at 3829 ft. Coupled with Gulf's failure 1320 ft west, the Sun failure appeared to cut off any chance of the field extending north into an area previously believed promising.

Arenac County—Wildcat: W. L. McClanahan's Milligan 1, Section 3-19n-6e, again is active at 4257 ft headed for possible 4300 ft pay horizon in Detroit River section of Monroe. After standing idle five days well flowed 52 bbls oil from a pay logged at 4167 ft.

MICHIGAN FIELD COMPLETIONS

Arenac County — Adams: Ervin Major's Hasty 1, c nw se 27-19n-3e, Dundee lime, dry, td 3105 ft.

Bay County — Kawkawlin: Gulf Refining Co.'s Francis 1, n½ nw sw 1-14n-4e, Dundee lime, flow 170 bbls after acid, td 2863 ft.

L. C. MacGregor's Staudacher 7, s¼ ne sw 2-14n-4e, Dundee lime, flow 161 bbls, td 2870 ft.

Clare County — Winterfield: Taggart Bros. Co.'s Brown 6, c ne 3-19n-6w, Stray sand, gauged 550,000 ft gas, td 1315 ft.

Taggart Bros. Co.'s State 7, c ne 5-19n-6w, Stray sand, dry, td 1340 ft.

Taggart Bros. Co.'s Plesum 3, c nw 4-19n-6w, Stray sand, gauged 2,000,000 ft, td 1308 ft.

Taggart Bros. Co.'s Plesum 4, c ne, 4-19n-6w, Stray sand, gauged 2,100,000 ft, td 1315 ft.

Mecosta County—Fork: Sun Oil Co.'s Murray 2, s½ sw nw 5-16n-7w, Dundee 3818 ft, td 3829 ft, dry.

Osceola County—Evart: Sun Oil Co.'s Wirth 2, n½ se sw 22-18n-8w, Dundee lime, flow 275 bbls, td 3781 ft.

Ottawa County — Zeeland: Perry et al's Nkyamp 1, se nw ne 31-5n-14w, Traverse lime, pump 45 bbls, td 1488 ft.

Van Buren County—Bangor: T. C. Hudson's Starz 6, sw nw nw 28-2s-16w, Traverse lime, dry, td 1249 ft.

MICHIGAN WILDCAT COMPLETIONS

Arenac County—Failure: Ervin Major's Lalone 1, c nw ne 5-18n-5e, abnd, td 3100 ft.

Clinton County—Failure: American Drilling Co.'s Redmond 1, n½ ne ne 20-5n-1w, Monroe 2823 ft, dry, td 2895 ft.

Kent County—Failure: Jetter & deKraft's Merrill 1, sw sw nw 23- Traverse 2048 ft, dry, td 2430 ft.

Lake County—Failure: Lupher Drilling Co.'s Manistee 1, c ne ne 10-18n-12w, Dundee 3246 ft, dry, td 3502 ft.

Union County Well Pumps Large Amount

Sun Oil Company's Uniontown Unit 1, Union County, Kentucky, C. W. Line SW 16-P-20, one half mile east of Uniontown, on pump test from the Waltersburg sand at 1820-54 feet made 388 barrels in 20 hours, showing about five percent water. Starting at surface elevation of 451 feet, hole was bottomed at 2653 feet.

In the same area, Sun Oil Company's W. Morgan-R. S. Davis 1, C S½ SE SE 20-P-19, was rigging up rotary to spud. Is about 1200 feet southeast of new pool discovery well.

Men in the Industry's News

DONALD W. FAIRBAIRN has been appointed manager of a new sales district for national sales and service division of B. F. Goodrich Company, established in Pacific Coast area, with exception of Seattle. Headquarters will be in Los Angeles.

Other changes in the division are: William R. Edwards, formerly salesman in the industrial products division, takes over Fairbairn's duties. W. B. Collier has been named sales engineer on fuel cells. H. V. Dwight, formerly technical representative in the Washington office, is sales engineer on rubber tracks.

H. V. Kidwell has been assigned to the Detroit district. R. A. Maxwell has been named staff man on all tire problems other than aeronautical; and L. I. Gibbons transferred to the company's field engineering department in Detroit.

ENSIGN ROBERT K. GUTHRIE, formerly assistant petroleum engineer, Bureau of Mines, Dallas, Texas, and now on military leave from the Bureau, has completed a six-month training period at Harvard University and Massachusetts Institute of Technology. He has been retained at M. I. T. as an instructor in the Radar Section of the U. S. Naval Reserve.

DR. KENDALL E. BORN of the Tennessee Geological Survey spoke on "Pre-Cretaceous Rocks in the North Part of the Mississippi Embayment" before the Houston Geological Society, November 13.

J. B. MITCHELL, deputy supervisor, Tulsa office of United States Geological Survey, is being transferred to Washington, D. C. His place is to be taken by E. M. Pilkington, district engineer, Oklahoma City. Marshall F. Stiles, Jr., engineer at Washington, is moving to the Tulsa office to replace John A. Anderson who is going to Oklahoma City to succeed Pilkington.

E. W. HAMILTON, formerly with Culham Petroleum Company, Tulsa, is now with the U. S. Army and is stationed at Camp Claiborne, Louisiana, as a captain.

JAMES W. PARKER, president of American Society of Mechanical Engineers, addressed members of the Mid-Continent Division and members of Engineers Club of Tulsa, November 9. He stressed the philosophy of the engineer and how his training should be put to use in laying the foundation for future peace.

J. W. PARKER, president, American Society of Mechanical Engineers, and vice president and chief engineer of Detroit Edison Company, spoke on "A New Engineering Phase" before the Mid-Continent section of the Association in meeting at Tulsa, November 5.

E. J. HAMMERLY, salesman in the Philadelphia district of the Industrial Products Sales division of The B. F. Goodrich Company recently completed 30 years of service with his organization. He started work with Goodrich on October 14, 1912, as a clerk at Akron.

R. H. McPEAKE, sales manager of the Export Division, Oil Well Supply Company, New York, has been commissioned a lieutenant in the USNR and left New York to assume his new duties. During McPeake's absence, the manager of the Export Division, M. E. Nicklin, will be assisted by M. E. Keenan who was transferred from a Canadian district early this year.

McPeake is a graduate of the U. S. Naval Academy, class of 1930, and has been connected with the oil industry since his graduation. He has lived and traveled extensively in South America during his association with the Export Division of the company.

THOMAS L. FOSTER, general attorney for the Sun Oil Company, died November 7 at Dallas, where he had resided since 1925. He was a graduate of University of Texas, and served one term in the Texas legislature.

GEORGE VORBE, Midland, Texas, consulting geologist, has joined the staff of the New Mexico School of Mines at Socorro as associate professor in geology. He has been engaged in geological work in West Texas and portions of New Mexico since 1925, excepting 1931-34 when he taught geology at University of California.

J. ED DICKINSON, Midland operator and formerly with Sun Oil Company, has been engaged as West Texas and New Mexico sales representative of the Visco Products Company, Inc., Houston firm that manufactures oil-treating compounds.

W. G. ROSS, formerly stationed at Great Bend, Kansas, has been transferred to Midland as the West Texas representative of Stanolind Oil Purchasing Company, which purchases in Winkler, Ward and Gaines counties.

WILLIAM E. WARENSKJOLD, scout for Magnolia Petroleum Company in Oklahoma City district, has entered the Army, and will be succeeded by James B. Morris, former land department employe at Tyler, Texas.

THOMAS W. SIMMONS, president, Bolsa Chica Oil Corporation, is among 83 business and professional leaders in the United States, who are attending a four-week orientation course in Army organization and procedures at the General Staff school, Fort Leavenworth, Kansas.

M. E. MONTROSE, vice president of Lane-Wells Company, has just returned from a seven-weeks trip through the Mid-Continent and Gulf Coast areas and also through the East where he visited plants of some of the nation's leading machine tool manufacturers. Lane-Wells operations during the past year have been expanded to include the manufacture of specialized machine tool accessories for the metal working and oil tool industries.

W. B. WILSON, geologist, Gulf Oil Corporation, spoke before the Tulsa Geological Society recently on "The Role of Geology in the Second World War.

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Squeaks from the Bull Wheel

Sad Experience

He was enlarging on the dangers of modern foods, and with a dramatic gesture he pointed a finger at a harassed-looking inoffensive listener: "What is it we all eat at some time or other, yet it's the worst thing in the world for us? Do you know?"

It appeared the little man did know, for he replied in a husky whisper: "Wedding cake."

Highly Unlikely

A group of London housewives were discussing the progress of the A. R. P. in their neighborhood. Said one: "Yer know, Mrs. A. 'as got a bucket of sand in 'er 'ouse, and so 'as Mrs. F. They say it's fer them incendiary bombs. Daft, I calls it! I bet if we get any bombs, there's not one in a thousand 'at 'll ever drop i' t' bucket."

Looking for An Opening

Little Marjorie was very fond of talking. One day, when some guests were expected for dinner, her grown-up brother tried to impress upon her the necessity of speaking only when spoken to.

"All right," the child finally agreed, "but do please ask me some questions."

Impressions

A traveling salesman dropped in on a bank officer whose desk was covered with letters, papers, magazines and miscellany. The banker was busily writing a memo and greeted the salesman with: "I'm very busy this morning, very busy!" Glancing at the desk the salesman replied: "Well, I'm very glad to know that. I kinda thought you were just confused."

Warned

Michael had taken a strong dislike to kindergarten. All persuasion failed, and finally his mother, in desperation, told him firmly that he would have to go. "All right, Mother," retorted Michael. "If you want me to grow up into a bead-stringer, I'll go."

Inefficiency

The nicest indictment of mediaeval inefficiency we've seen for some time is that of a transport authority who points out that the 19 stone piers of Old London bridge were constructed without engineering experience adequate for the enterprise, so the bridge functioned only 600 years.—London Daily Chronicle.

These Moderns

"Grandmother, can you help me with this problem?"

"I could, dear, but I don't think it would be right."

"Maybe it wouldn't, but take a crack at it, anyway."

Obvious

"Did you tell her, when you proposed to her, that you were unworthy of her? That always makes a hit."

"I was going to, but she told it to me first."

Not Any More

"My husband calls a spade a spade, you know."

"Well, my husband used to before he tried to dig up the garden."

Distinction

An old Negro woman in attendance upon the Monday morning Police Court was slumped in her chair, her head resting dejectedly upon one hand.

"Well, Mammy," suggested a compassionate lawyer, observing her, "have you been fighting again?"

"No, sah," promptly came her indignant denial. "No, sah, I ain't been fightin.' I been fit."

This Is, Too

"I wouldn't touch Tommy with a ten-foot pole."

"What's wrong with him?"

"Oh, nothing, but wouldn't it look silly?"

Equally Dangerous

"Is this good?"

"I don't know. I haven't read it."

"A bookseller and you don't read your books!"

"Well, why should I? If I were a chemist would you expect me to try all my drugs?"

Extenuating Circumstances

The late Governor Oglesby, of Illinois, was inspecting the prison when he came upon a man brooding in a cell who proved to be the ugliest man he had ever seen in his life.

"What are you in for?"

"Abduction. I fell in love with a girl and tried to kidnap her, but they caught me."

"I'll pardon you as soon as I get back to Springfield. I don't really see how you could have expected to get a wife in any other way."

Quoted With Credit

The first day at camp he was utterly exhausted after several hours of drilling.

"At ease," finally ordered the officer.

"How wonderful is death," muttered the recruit.

"Who said that?"

"Shelley, I believe, sir."

Youthful Interpretations

Jimmy is three years old and very fond of telling his dreams at the breakfast table. One morning his father, thinking to apply an intelligence test, said, "But, Jimmy, I don't believe you know what a dream is."

Jimmy's answer came quick and sure: "Yes I do. It's movin' pi'tures while you're 'sleep."

Army Menus

Inducted into the army, he sat down to his first meal at Uncle Sam's expense. Surveying the stew disdainfully, he asked the soldier next to him: "Don't you get any choice around here?" "Sure" beamed his companion, "you get two choices. You can take it—or leave it."

Exempt

"Of course, madam, you won't expect me to clean windows?"

"Oh, no; of course not."

"Nor to sweep?"

"Certainly not."

"Nor answer the bell?"

"No, indeed."

"Nor—"

"No, no. I expect none of these things from my maid. I only want her to look at, and for that you are too plain."

Easy One

"I've been trying to think of a word for two weeks."

"How about fortnight?"

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3100 W. Cherry St. Milwaukee, Wis.

Notes for the Equipment Buyer and User

Fabric Bearings

GATKE CORPORATION

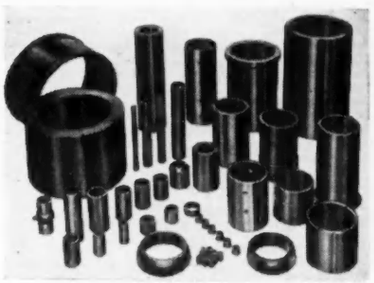
The Gatke Corporation, 228 North LaSalle Street, Chicago, Illinois, has announced that shortage of critical bearing metals is being overcome and performance results greatly improved through use of oil lubricated non-metallic moulded bearings.

Known as Lubritex Bearings, they are distinctly different from Gatke Hydrotex (water-lubricated) and Gatke Grafitex (self-lubricated) bearings in that they are made of various material combinations developed especially to meet all kinds of service conditions using grease or oil lubrication.

According to the manufacturer, Gatke Lubritex Bearings are replacing conventional bearings with highly satisfactory results on all kinds of service. They stand up under impact loads that are too great for metal bearings—have much greater wear life and lower friction. Lubrication is much less critical——they do not score journals, even if lubrication fails for limited periods.

These unique non-metallic bearings are engineered for the application and moulded to finished dimensions in all shapes and sizes for replacing metal bearings.

Performance results of service conditions are described in a recent catalog.



Gatke Bearings

Welding Machine

WILSON WELDER AND METALS COMPANY, INC.

Wilson Welder and Metals Company, Inc., New York, has announced a new transformer type welding machine that combines exceptional safety with improved operating efficiency.

The most interesting feature of the new Wilson "Bumble Bee" AC welder is its low open circuit voltage of 42 volts, automatically and positively maintained by means of recent Wilson engineering developments.

Two primary coils are used instead of the usual one, with a magnetic contactor in the circuit of one primary. Each primary contributes approximately 42 volts to the total open circuit voltage, which is actually 84 to 85 volts. However, when the machine is idle one primary is automatically cut out, restricting the open circuit value to 42 volts. As soon as the electrode contacts the work, the second primary is thrown into the circuit, and if there were not a dead short, the voltage would be 84-85 volts.

When the operator draws an arc, this open circuit potential of 84-85 volts enables him to establish his arc quickly and begin welding. Most welding operations are performed at between 32 and 40 volts. When welding is completed and the operator pulls out or lengthens his arc, the arc voltage rises. The moment it reaches 45 volts, the contactor opens and cuts out one primary, leaving only 42 volts in the open circuit.

Several other improvements incorporated in the new Wilson "Bumble Bee" make it an important advancement in AC welding. Power factor correction is provided with built-in capacitors on all four sizes—300, 500, 750, and 1000 amperes—resulting in a power factor of 100 percent to 86 percent (lagging) over the popular working range. With Wilson's new wiring arrangement, capaci-

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The Universal Sucker Rod Wiper developed by Patterson-Ballagh embodies a double seal, free-floating wiping element made of toughest rubber. The pump itself can be pulled through. Compact, low-height steel housing. See Composite Catalog.

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tors are cut out when the machine is idle thereby conserving power and reducing costs.

Additional features contribute to its life, performance and appearance. It is portable and streamlined, and its 18-inch width permits easy passage through narrow doors. It has dual voltage connections for either 220 or 440 volts and thermal overload protection provided by a cutout coil buried in the winding. A single hand wheel control gives an infinite number of current adjustments throughout the NEMA range.

Safety Hat

B. F. McDONALD COMPANY

B. F. McDonald Company, Los Angeles, California, has announced a new safety hat, made of laminated bakelite and known as type "P" hat.

It replaces for the duration the company's well-known type "T" metal hat and incorporates the same headband suspension, making the hat quickly and easily adjustable to all head sizes.

Advantages of the type "P" plastic hat are its lightness, exceptional strength and resistance to heavy blows. Adequate ventilation (the same as provided in the "T" hat) keeps the head cool in hot weather, and the hat's lightness makes it comfortable to wear over day-long periods. Its good looks are said to be welcomed by workmen who wear the hat to and from jobs without feeling self-conscious. The headband is fully suspended to provide a cushioning hammock against the shock of heavy blows. The hat may easily be cleaned or sterilized by steaming or any other preferred method.

Generator

SUPER MOLD CORPORATION

Super Mold Corporation, Lodi, California, has announced a simple, compact steam generator which needs only fuel and water for automatic operation.

A new principle of water feeding, incorporating jet control, automatically and without the use of thermostats or motor driven pumps, furnishes feed water in direct proportion to the amount drawn off as steam.

Once the generator has been lighted it is completely operated by the steam throttle valve or load.

The Lodi generator has only three moving parts, resulting in remarkable simplicity and reliability. The 10 h.p. model will develop 150 pounds pressure from a cold start in less than five minutes. Other models up to 70 h.p. are to be produced.

The Lodi is a simple, compact generator, which is shipped complete, and is ready to operate when furnished with fuel and water. Burners are provided for either gas or oil fuel. No pit is required, and no fire boxes or electrical connections need be installed.

The generator is explosion-proof because the steam is carried entirely in an overlapping, continuous coil, tested to 1000 pounds.

Gathering System Sold

Champlin Refining Company has purchased the gathering facilities of Pope-Virtus, Inc., in the Konawa and adjacent sectors, with loading rack at Oklahoma City. The purchaser is incorporating the acquired lines into the firm's Seminole-Pottawatomie County gathering system.

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*McCullough Tool Co. —
*McEvoy Co. —
*McKissick Products Corp. —
*Merco Nordstrom Valve Co. I Cover
*Metric Metal Works —
*Mission Manufacturing Co. 19
*Morse Chain Co. —
Murphy Diesel Co. —
National Bank of Tulsa —
National Geophysical Co. —
National Hotels —
*National Lead Co. —
The National Supply Co. —
National Tube Co. 32
New Bedford Cordage Co. —
Nicholson File Co. 21
*The O. C. S. Manufacturing Co. —
*Oil Center Tool Co. —
*Oil City Brass Works 55
Oil Industry Mailing List Co. —
Oil Well Supply Co. —
*Otis Pressure Control, Inc. —
*The Parkersburg Rig & Reel Co. —
*Patterson-Ballagh Corp. 71
*Pelican Well Tool & Supply Co. 68
Petroleum Electric Power Association —
Petroleum Rectifying Company of California —
*Pittsburgh Equitable Meter Co. I Cover
*Pittsburgh Steel Co. —
*Plymouth Cordage Co. —
Power Specialty Co. —
*Quaker Rubber Corp. —
*Raybestos-Manhattan, Inc. —
Reading-Pratt & Cady Division, American Chain & Cable Co. 25
*Rector Well Equipment Co. —
*Reed Roller Bit Co. 6
Reforma Hotel —
Republic National Bank in Dallas —
Republic Steel Corp. —
*The Ridge Tool Co. —
*John A. Roebling's Sons Co. —
*Rollway Bearing Co. —
Rouse Exploration Drilling Co. —
*SKF Industries, Inc. —
*Schlumberger Well Surveying Co. —
The Second National Bank in Houston —
Seismic Explorations, Inc. —
Seismograph Service Corp. —
Shell Development Co. —
Sharman and Allen 57
A. O. Smith Corp. —
*Southern Mill & Manufacturing Co. —
*Spang & Co. —
Spang Chalfant, Inc. —
*Sperry-Sun Well Surveying Co. —
*Standco Brake Lining Co. —
Tank Seal Products Co. —
Tennessee Coal, Iron & Railroad Co. 32
Texaco Development Corp. —
*Texas & Louisiana Tool Co. —
*Texasteel Manufacturing Co. —
*Texsteam Corp. —
The Thermoid Co. —
*Thompson Tool Co. —
*Thornhill-Craver Co. 69
Treasury Department —
*Tretolite Co. —
*Union Carbide and Carbon Corp. —
*Union Wire Rope Corp. —
*Unit Rig & Equipment Co. —
United States Steel Corp. 32
*Universal Atlas Cement Corp. —
Valley Steel Products Co. —
Visco Products Co. —
Warner & Swasey Co. —
Warren Automatic Tool Co. —
Waugh Laboratories —
*Waukesha Motor Co. —
*Westinghouse Electric & Mfg. Co. —
*The Wheland Co. —
White-Plaza Hotels —
*The Whitney Chain & Manufacturing Co. —
Whitney National Bank —
*Wickwire Spencer Steel Co. —
*J. H. Williams & Co. —
*Wilson Manufacturing Co. —
Wilson Supply Co. —
*Wisconsin Motor Corp. —
*Worthington Pump & Machinery Corp. —
Wyatt Metal & Boiler Works —
York Oilfield Supply Co. 55
The Youngstown Sheet & Tube Co. —